

Cherry A. Murray

Professor of Physics and Director of Biosphere2 Institute,
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Benjamin Peirce Professor of Technology and Public Policy and Professor of Physics, Emerita
Harvard University, Cambridge MA

Professional Objective

Management of basic and applied science and high technology research and development. management of innovation with cross-disciplinary teams of scientists and engineers. management of national security research and development. Leadership of higher education. Education of the 21st century workforce. Science and technology policy, sustainable development and energy innovation.

My research over the years has been basic and applied research in the area of experimental condensed matter physics in a number of areas including optical phenomena at surfaces and in semiconductors, complex fluids, disordered systems and systems of lower spatial dimensions, clusters and nanostructures, non-equilibrium phenomena, and phase transitions.

Education

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Ph.D. in physics, June 1978. Thesis under Professor T. J. Greytak: “Raman scattering from intrinsic surface phonons and molecules adsorbed on the surface of porous glass.” Ultra high vacuum experiment using Raman scattering and infra-red reflection techniques to investigate the interaction of adsorbed molecules and surface phonons on high surface area silica samples. This is the first experiment in which substrate phonons and their perturbations due to chemisorption were observed with Raman scattering.

Concentration in experimental condensed matter, surface and low temperature physics.

Bachelor of Science, June 1973. Thesis under Professor T. J. Greytak: “Measurement of two-roton Raman scattering from superfluid helium.” High resolution light scattering from superfluid ⁴He at 0.3K accurately determined the lineshape and binding energy of bound pairs of rotons.

Experience

UNITED STATES GOVERNMENT APPOINTMENTS

July, 2018 to present. Special Government Employee, Department of Energy. *Expert Consultant to the National Nuclear Security Administration, as Member of the Defense Programs Advisory Committee.*

July, 2018 to present. Special Government Employee, US Patent and Trademark Office, Department of Commerce. *Member of the Selection Committee for the National Medal of Technology and Innovation.*

January 13, 2017 to July, 2018. Special Government Employee, Department of Energy. *Expert Consultant to the Office of Science.*

December 18, 2015 to January 13, 2017. *Director of Science, Department of Energy.* Presidential Appointee, Senate Confirmed. Responsible for overseeing research with an annual budget of five and a half billion dollars in the areas of advanced scientific computing, basic energy sciences, biological and environmental sciences, fusion energy sciences, high energy physics, and nuclear physics. Responsible for supporting the majority of physical scientific research in the U.S., and for the development, construction, and operation of unique, open-access scientific user facilities. The Office of Science also manages 10 of the Department's 17 National Laboratories.

November 1, 2015 to December 18, 2015. *Senior Advisor to the Secretary, Department of Energy.* Non-career Senior Executive Service appointment. Advised the Secretary in the organization of a coordinated applied energy program strategic program and national laboratory planning process within the Office of the Undersecretary for Science and Energy.

September 2014–July 2015. Special Government Employee, Department of Energy. *Commissioner, National Commission to Review the Effectiveness of the National Energy Laboratories.*

September 2013- September 2015. Special Government Employee, Department of Energy, *Member, Secretary of Energy Advisory Board.*

June 2010–January 2011. Special Government Employee, Department of Energy, *Commissioner, National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling.*

UNIVERSITY OF ARIZONA

July 1, 2019 to present. *Professor of Physics and Director, Biosphere2 Institute*
My current interests are in transdisciplinary science and engineering education and citizen engagement with science; furthering diversity in the science community; science and technology policy and the sustainable development of communities in the developing world, with an emphasis on providing entrepreneurial and scalable solutions in food, water and energy and for all of the UN Sustainable Development Goals.

HARVARD UNIVERSITY

July, 2015 to June 30, 2019. *Benjamin Peirce Professor of Technology and Public Policy and Professor of Physics, John A. Paulson School of Engineering and Applied Science, on sabbatical from January 1, 2015 and leave of absence for government service from November, 2015 to January, 2017. On a sabbatical from July 1, 2018 to June 30, 2019 at the University of Arizona and with multiple national and international organizations.*

July, 2009 to December 31, 2014. *Dean, School of Engineering and Applied Science and John A. and Elisabeth S. Armstrong Professor of Engineering and Applied Science and Professor of*

Physics. Responsible for managing new faculty recruitment and faculty relations; directing and leading academic planning; coordinating fundraising and alumni relations; determining and implementing educational, research, fundraising, space, budget and administrative goals for a new school of Harvard established in 2007.

Led faculty strategic planning and enhancement of undergraduate educational programs with engineering design and active learning experiences resulting in a factor of three growth of Harvard College students concentrating in engineering and applied sciences and taking SEAS classes. Successfully argued for expansion of the school's faculty and space and a large fundraising goal in the upcoming Harvard Campaign, including leading the effort to design and build new engineering research and teaching buildings in Allston. Raised over \$170M in the beginning of a five year fundraising campaign for the school. Led a committee of deans on the future of Harvard that ultimately led to Harvard's partnership with MIT on an open source online learning initiative.

Teaching areas in the school are in applied mathematics, applied physics, bioengineering, computational science and engineering, computer science, electrical engineering, environmental science and engineering, materials science and engineering and mechanical engineering. Research is interdisciplinary and focused on 21st century global problems, especially in translational life sciences; applied computation spanning applied math, computer science and computational science; materials for energy; environmental science and engineering; nano-photonics and electronics; and robotics and control theory.

LAWRENCE LIVERMORE NATIONAL LABORATORY

October, 2007 to June 2009. *Principal Associate Director for Science and Technology.* In addition to the Deputy Director's responsibilities below between December 2004 and October 2007 for institutional science and technology activities, was responsible for writing the major section on science and technology strategy of the winning proposal for management and operations of the laboratory. Key official in Lawrence Livermore National Security, LLC, a partnership of Bechtel, the University of California, BWXT, Washington Group and Battelle formed to manage the Laboratory. Responsibilities included line management of 3500 people in the Science and Technology Principal Directorate, which provided matrix support and core science and technology to the major programs of the laboratory, as well as continuing the oversight of institutional science and technology and the development of the laboratory's strategic science and technology plan. Responsible for standing up all new processes and procedures and managing a major cost-cutting and workforce restructuring initiative under the new contract.

December, 2004 to October, 2007. *Deputy Director for Science and Technology.* Under DOE management contract with the University of California for the Laboratory, university official responsible for leading and overseeing the \$1.6B Laboratory's science and technology activities, including development of the Laboratory strategic science and technology plan; development of standards for scientific research performance and program quality; and oversight of efforts to recruit, develop and retain the Laboratory's scientific, engineering and technical workforce. Responsible for oversight of interactions with universities, industry and science funding agencies other than DOE NNSA, and for direction of the Laboratory's \$130 million institutional research and development program, collaborating closely with University of California faculty and staff.

BELL LABORATORIES, LUCENT TECHNOLOGIES

October 2001 to December, 2004: *Physical Sciences and Wireless Research Senior Vice President*. In addition to the responsibilities below between Oct 2000 and 2001, created and implemented a process to produce and implement annual strategic plans for Bell Labs Research, in the areas of physical and mathematical sciences, computer science and software, optical, data and wireless networking. Set up the business development for Bell Labs Research including interfacing with Lucent's intellectual property business and the government customer business as well as partnership with external R&D organizations. Established a leadership training and coaching program for Bell Labs technical managers. Managed the relationship between Research and the Lucent wireless networking business, Lucent's largest business unit, for two years. Spearheaded state, industry, government lab and university interest and the formation of the New Jersey Nanotechnology Consortium, LLC (NJNC), an industry-university-government consortium for R&D, economic development in the region and commercialization of nano-manufacturing. The NJNC became a wholly owned subsidiary of Lucent in early 2003 and was managed as a separate profit and loss center in the Physical Sciences Division. I served as the nonexecutive chairman between 2002 and 2004. From 2003 until December 2004 I had line management responsibility for the Physical Research Lab, the Wireless Research Lab and the Nanotechnology Research Lab, including the NJNC.

April 2000 to October 2001: *Physical Sciences Research Senior Vice President*. Initiated and or managed research programs in fundamental physics, materials science, chemistry, biological computation, micro-electromechanics and nano-electronics, as well as silicon and high speed electronics, photonics and wireless technology for telecommunications applications and Lucent Technologies future products. Responsible for managing initially about 400 researchers, and transitioning the division during the spin off of Lucent's microelectronics and optical fiber businesses. Managed the research and development in collaboration with Lucent business units leading to several industry-leading products, including 40Gbit electronics for Lucent's high end optical products and the Wavestar LambdaRouter, the world's first all optical cross-connect.

June 1997 to March 2000: *Director, Physical Research Laboratory*. Initiated and or managed research programs in fundamental physics, biophysics, biological computation, chemistry and materials research, as well as thrusts in applied physics and materials, integrated RF components, micromechanics and devices and circuits for high speed optoelectronics, leading to inventions and innovations for future communications technologies of importance to Lucent Technologies. Responsible for the management of 150 researchers. Initiated development programs, partnering with several business units of Lucent, for several products for optical networking and electronics, including free space optical micromechanical systems (MEMS) wavelength cross connects and other optical subsystems, 40Gb/s electronics for optical networking, and bulk acoustic resonators for RF filter applications.

July 1993 to June 1997: *Head, Semiconductor Physics Research Department*, Bell Labs, Lucent Technologies since 1996, formerly AT&T Bell Labs. Initiated and or managed research programs in MBE growth of GaAs/AlGaAs, superconducting oxides and wide band gap III-V's, correlated two-dimensional electron systems in quantum wells, near field optical microscopy, low temperature ultrahigh vacuum scanning tunneling microscopy of superconductors and semiconductors, low frequency and microwave noise in semiconductor devices, terahertz phenomena in semiconductors and devices, pulsed ultra high magnetic fields and near field optical data storage, while carrying on my own research program in order-disorder transitions in colloidal crystals and superconducting flux lattices and an optical study of very small

monodisperse Si quantum dots as described below. Managed the spin-off of near field optical data storage technology to a small business.

October 1990 to July 1993: *Head, Condensed Matter Physics Research Department, AT&T Bell Labs.* Initiated and or managed research programs in nonequilibrium physics, surface phase transitions, frustrated magnetic systems, correlated electron systems, quasicrystals, nonlinear dynamics, complex fluids, muon spin resonance and positron surface interactions, while carrying on my own research program.

September 1987 to September 1990: *Head, Solid State and Low Temperature Physics Research Department, AT&T Bell Labs.* Initiated and or managed research programs in low temperature physics, mesoscopic physics, the study of metal-insulator transitions, magnetic resonance of superconductors, low dimensional magnetic systems and spin glasses, transport in superconductors and quasicrystals, nonlinear dynamics, and astrophysics, while carrying on my own research program.

July 1978 to 1987: *Member of Technical Staff* in the Physical Research Laboratory, AT&T Bell Labs.

(1978 to 2001) Experimental research in surface, condensed matter and complex fluid physics, with emphasis on light scattering and imaging. Experiments on surface enhanced Raman scattering, interactions of positrons with surfaces, spontaneous Raman scattering from sub monolayers on metal surfaces in ultra high vacuum, imaging Bitter patterns of Abrikosov flux lattices in high T_c superconductors, digital imaging and diffraction of light from colloidal crystals and fluids, and optical studies of monodisperse Si clusters isolated into cryogenic matrices in ultrahigh vacuum. Conclusively proved the long distance nature of electromagnetic dipole enhancement in surface enhanced Raman scattering by spacer experiments. Initiated the use of back-thinned very high quantum efficiency CCD detectors for the multichannel collection of low light level Raman scattering, and also the use of time resolved digital imaging of monodisperse submicron colloidal spheres as a model system for studying fundamental problems in condensed matter physics such as phase transitions and the structure of fluids and disordered solids. Discovered a hexatic vortex glass in the flux lattice of high temperature oxide superconductors at low fields using Bitter imaging. Provided the first experimental confirmation of the structure of Si_4 , Si_6 and Si_7 by the first measurement of the Raman spectrum of monodisperse clusters isolated at low concentrations in cryogenic matrices. Other research on the manufacture of new optical materials by assisted self-assembly of crystalline phases in a colloidal suspension and the structure and dynamics of a system of colloidal spheres undergoing a fluid-glass transition.

Summer 1976. Experimental plasma physics work with R. E. Slusher and C. M. Surko on CO_2 laser light scattering from driven ion acoustic waves in a helium positive column plasma doped with H and D impurities in a search for nonlinear damping effects. Designed and set up the optical heterodyne detector and optics and aligned and calibrated the 100W cw laser. The experiment has become a classic example of linear Landau damping.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

1974 - 1978. Research on ultrahigh vacuum and surface physics studying the surface phonons of porous vycor glass with Professor T. J. Greytak. Designed and constructed an ultrahigh vacuum light scattering apparatus, and observed the interaction of NH_3 and D with the surface hydroxyl

groups on the glass surface by Raman scattering. The surface phonons of the vycor glass sample were found to be well described by the Bethe lattice calculation of Laughlin and Joannopolous.

1973 - 1974. Research assistant. Research on low temperature physics and light scattering from elementary excitations in superfluid ^4He with Professor T. J. Greytak.

Summer 1973. Employed by Professor T. J. Greytak. Designed and constructed a double pass flat Fabry-Perot Spectrometer.

1972 - 1973. Undergraduate research on low temperature physics and superfluid helium under Professor T. J. Greytak. Designed and built a cell for precise calibration of the composition of ^3He ^4He gas mixtures by the measurement of the sound velocity.

1970-1971. Undergraduate research on InSb infrared bolometers and Josephson junctions under Professor R. Weiss.

Awards

National Merit Finalist 1969, placed 7th in all overseas scores; valedictorian, Seoul American High School, Seoul, Korea.

US State Department scholarship 1969-1973, MIT.

Sigma χ i, 1973.

IBM Graduate Fellowship 1975-1977.

Bell Laboratories Distinguished Member of Technical Staff, 1985.

Fellow, American Physical Society, 1987.

American Physical Society Maria Goeppert-Mayer Award, 1989.

Bell Labs Affirmative Action Awards, 1991, 1997.

Fellow, American Association for the Advancement of Science (AAAS,) 1998.

Elected to the National Academy of Sciences, 1999.

Elected to the American Academy of Arts and Sciences, 2001.

Elected to the National Academy of Engineering, 2002.

Named by Discover Magazine as one of the top 50 women in science, 2002.

American Physical Society George E. Pake Prize, 2005.

Fellow, California Council on Science and Technology, 2006.

Holst Lectureship for engineering education leadership, Technical University of Eindhoven, 2013.

William D. Carey Lecture on Science Policy, American Association for the Advancement of Science, 2014.

National Medal of Technology and Innovation, awarded by President Obama in November, 2014.

Other Activities

HARVARD SERVICE (as Dean of the School of Engineering and Applied Sciences)

Member, Faculty of Arts and Sciences (FAS) Academic Planning Group.

Member, FAS Committee on Appointments and Promotions.

Member, Harvard College Educational Planning Committee.

Chair, School of Engineering and Applied Sciences Educational Policy Committee.

Member, Harvard College Admissions Faculty Committee.
Member, Harvard University Council of Deans.
Member, Harvard University Science and Engineering Council.
Member, Harvard Science Deans.
Member, Wyss Institute for Biology Inspired Engineering Steering and Executive Committees, 2009-2013.
Member, Wyss Institute Board of Directors, 2013–2014.
Member, Harvard Innovation Lab Steering Committee.
Member, Harvard Catalyst Steering Committee.
Co-chair, Executive Board for Harvard Center for Nanoscale Systems.
Co-chair, Harvard Committee on Confidentiality in Research Misconduct, 2011.
Member, Innovative Pedagogy Committee, 2011.
Chair, Harvard at 400 Strategic Planning Committee, 2010-2011.
Member, Allston Planning Group, Allston Steering Committee.
Member, HarvardX Deans Oversight Committee.

NATIONAL ACADEMIES

Member, National Research Council (NRC) Committee on Condensed Matter and Materials Physics, 1996-1999.
Member, NRC Board of Physics and Astronomy Solid State Sciences Committee, 1997-2000.
Member, NRC Physics Survey Overview Committee, 1999-2001.
Member, NRC Board of Physics and Astronomy, 1999-2002.
Member, Selection Committee for the National Academy of Science (NAS) Award for Industrial Applications of Science, 2001.
Member, NRC Committee for the Review of the National Nanotechnology Initiative, 2002-2003.
Member, NAS Council and NAS Executive Board, 2002-2005.
Member, Governing Board of the NRC, 2003-2006, 2007-2010.
Chair of the National Academies Keck Futures Initiative Steering and Planning Committees for the 2004 conference on Designing Nanostructures at the Interface of Physical and Biomedical Systems, 2003-2004. Conference Chair, 2004.
Member, Temporary Nominating Group, Applied Sciences and Council Designee to the Class Membership Committee, NAS, 2003-2006.
Member, NRC Panel on Performance Measures for the Competition for Los Alamos and Livermore National Labs, 2004.
Member, National Academy of Engineering (NAE) Committee on the US Engineering Research Enterprise, 2005.
Member, Division of Engineering and Physical Sciences Committee, NRC, 2004 –2008.
Vice-chair, NRC Committee for the Review of the National Nanotechnology Initiative, 2005-2006.
Member, NRC Committee on Prospering in the Global Economy in the 21st Century (Rising Above the Gathering Storm Committee,) 2006-2007.
NAS Class III (Applied Sciences) Secretary, 2006-2009.
Member, NRC Committee on the Future of the Nuclear Security Environment of 2015, 2007-2008, an international workshop jointly sponsored by NAS and the Russian Academy of Sciences.
Chair, NRC Division of Engineering and Physical Sciences, 2008-2013, ex officio on National Research Council Governing Board.

Member, NAS Committee on International and Strategic Relations, 2009-2012.
Member, NRC Committee on Research Universities, 2010-2011.
Member, NRC Committee on Decadal Research in Nuclear Physics, 2010-2011.
Member, NAE Section 7 Peer Committee, 2010-2013.
Member, National Academies Workshop on Global Science Policy and Science Diplomacy, 2011-2012.
Member, NAS Committee on Science Technology and Law, 2011-2014.
Member, NRC Workshop on Convergence in Research, 2013.
Member, NRC Committee on Peer Review and Design Competition in the NNSA National Laboratories, 2014-2015.
Chair, Selection Committee for the NAS Raymond and Beverly Sackler Prize in Convergence Research, 2015.
Member, National Academy of Public Administration Committee to Review the National Academies of Science, Engineering and Medicine (NASEM), 2017.
Reviewer and monitor of numerous National Research Council studies.
NAS Class III (Applied Sciences) Chair, 2017-2020.
Chair of the 2018 NAE Nominating Committee, 2017.
Member of the 2019 NAE Nominating Committee, 2017-2018.
Co-Chair of the NAE Temporary Nominating Committee on Member Diversity, 2018-2020.
Chair of the NAS Nominating Committee, 2018.
Member, NASEM Transformation Oversight Committee, 2018.
Elected co-chair, InterAcademy Panel for Science as representative of the US National Academy of Science, term April 2018 – 2021.

AMERICAN ACADEMY of ARTS and SCIENCES

Member, Study Panel on the Federal Funding Impacts on American Research Universities, 2010-2011, resulting in ARISE 2 report.
Chair, Tri-Academy (NAE, Institute of Medicine, American Academy) Workshop on Privacy, Autonomy and Personal Genetic Information, 2011.
Member, Engineering Section Membership Committee, 2012-2015.
Member, Board of Directors, 2017-2021.
Member, Strategic Planning Steering Committee, 2018.
Member, Committee on International Science Collaborations Steering Group, 2018-2019.

AMERICAN PHYSICAL SOCIETY

Maria Goeppert-Mayer Award Committee, American Physical Society (APS) 1990, 2002-2004, Chair 2004.
APS Panel on Public Affairs, 1990-1993, 2007.
Member at Large, APS Forum on Education, 1992-1994.
Program Committee, APS Forum on Education, 1995-1996.
APS Forum on Education Fellowship Committee, 1997-2001.
Member at Large, APS Forum on Industrial and Applied Physics, 1997-2000.
APS Pake Prize Committee, 1997; Chair, 1998; Past winner 2005.
APS Task Force on Informing the Public, 1999.
APS Buckley Prize Committee, 1999; Chair 2000.
APS General Councilor and Executive Board, 2001-2004, 2007-2010.

APS Vice President, 2007; President Elect, 2008; President 2009; Past President, 2010.
APS Investment Committee, Budget Committee, Panel on Public Affairs, Physics Policy Committee, 2007-2010.
Chair, APS Fellowship Committee, 2007.
APS 21st Century Campaign Committee, 2007-2008.
Vice chair, APS LeRoy Apker Prize Committee, 2010; Chair, 2011.
Member, Committee on Development, 2012-2013.
Chair, External Advisory Board for the NSF funded APS Bridge Program, 2012-2015 (goal to increase the number of underrepresented minorities obtaining PhDs in Physics by a factor of two by 2020.)
Chair, Committee on Constitution and Bylaws, 2014-2015, as the APS reformed its corporate structure and adopted a new constitution and bylaws.
Member, Governance Committee, 2015.
Ex-officio member, Committee on Corporate Reform, 2014-2015.

VISITING COMMITTEES and BOARDS

ACADEMIC

Member, Visiting Committee, Harvard Physics Department, 1993-2004.
Member, Industrial Liaison Committee, Materials Research and Engineering Center, University of Chicago, 1993-1999.
Member, Industrial Liaison Committee, Materials Research and Engineering Center, Harvard University, 1994-1998.
Member, Visiting Committee to the Division of Physical Sciences, University of Chicago, 1996-2004.
Member, Science and Engineering Advisory Board, Materials Research and Engineering Center, MIT, 1997-2001.
Member, Visiting Committee, Massachusetts Institute of Technology (MIT) Physics Department, 1997-2017.
Member, Visiting Committee, Simon Fraser University Physics Department, 1998.
Member, Visiting Committee, University of Pennsylvania Physics Department, 1999.
Chair, Industrial Liaison Committee, Columbia University Materials Research Science and Engineering Center , 1999-2004.
Member, Visiting Committee, Pennsylvania State University Physics Department, 2001.
Member, Scientific Advisory Committee, University of Arizona Physics Department, 2002 - 2009.
Member, University of Chicago Advisory Committee to the VP of Research on Science Research and Outreach, 2004-2008.
Member, Science Advisory Board, University of Illinois Urbana-Champlain Beckman Institute, 2004-2007.
Member, UC Santa Barbara International Advisory Board, College of Engineering, 2005-2008.
Member, UC Davis Vice Chancellor for Research External Advisory Board, 2005-2008.
Member, NASA Ames External Advisory Board, 2005-2006.
Member, University of Arizona College of Arts and Sciences Biosphere2 External Advisory Board, 2007-2015, and April, 2017 to present.
Member, Visiting Committee, Texas A&M University Physics Department, 2008.
Member, Visiting Committee, University of Delaware Materials Science and Engineering Department, 2008.

Member, Olin College President's Council, 2010 – 2015.
Member, Visiting Committee, Harvard Kennedy School of Government Belfer Center, 2010.
Member, Northwestern University NSF Materials Research Science and Engineering Center Advisory Board, 2010-2014.
Member, Presidential Advisory Board for the Carnegie Mellon University Department of Engineering and Public Policy, 2011.
Member, NSF ADVANCE Center External Advisory Board, Texas A&M University, 2011–2014.
Mentor, ELATE Engineering Leadership Program for Women in Academia at Drexel University, 2013; mentor and commencement speaker, 2014.
External Strategic Advisor, National Society of Black Physicists, 2014 – 2015.
Reviewer, Purdue University Discovery Park Innovation Challenge, 2017.
Member, Advisory Board, Harvard Center for Green Buildings and Cities, 2017 – present.
Member, Advisory Board, M.I.T. Environmental Solutions Initiative, 2017 – present.
Member, External Review Committee, Yale Physics Department, 2018.
Member, NSF STROBE Science and Technology Center External Advisory Board, U. Colorado, 2018.
Member, External Review Committee, Stanford Electrical Engineering Department, 2019.

EDUCATIONAL K-12 INITIATIVES

Member, Governing Board, Smithsonian Institution and National Academy of Sciences National Science Resources Center, 1999- 2004.
Member, Advisory Board, National Sciences Resources Center K-8 Science and Technology Education Reform Initiative, 2000-2004.

OTHER US SOCIETIES AND NON-PROFITS

Member, Nanotechnology Advisory Group, President's Council of Advisors on Science and Technology, 2003–2006.
Member, Governing Board, American Association for the Advancement of Science, 2008-2011.
Member, Governing Board, American Institute of Physics, 2007-2010.
Member, Advisory Board, Research Corporation for Science Advancement, 2011-2014.
Member, Scientific Advisory Board, Gordon and Betty Moore Foundation, 2012- 2015.
Member, 2018 Connecticut Medal of Technology Selection Committee.

INTERNATIONAL

Chair, Commission on the Structure and Dynamics of Condensed Matter and Liaison to the Commission on Semiconductor Physics, International Union of Pure and Applied Physics (IUPAP,) 1997-2002.
US Delegate to the IUPAP General Congress, Geneva, 1999.
US Liaison Committee Member at Large, IUPAP, 2003 – 2009.
Member, Science Foundation Ireland Advisory Board, 2002 –2004.
Member, International Engineering Consortium Advisory Group, 2003 - 2004.
Member, Dan David Prize in Materials Science Selection Committee, 2005.
Member, Kavli Nanotechnology Prize Selection Committee, 2007 - 2008.

Member, Governing Board, Okinawa Institute of Science and Technology Graduate University (OIST), 2011 – 2015 and 2017 to present.
Member, Steering Committee of the Board, OIST, 2013 – 2015 and 2018 to present.
Chair, Governing Board, OIST, November 2017 to present.
Member, Scientific Advisory Board, Singapore National Research Foundation, 2013 – 2015, and 2018 – present.
Member, Japan Science and Technology for Society Forum Council and Program Committee, 2013 - 2015, and June 2017 to present.
Chair of the Scientific Evaluation Committee of the Forschungszentrum Jeulich in Energy Technologies, Helmholtz Foundation, 2017-2018.
Member of the Board of Strategic Reviewers and External Scientific Advisors, Energy Program Helmholtz Association, 2018 – present.
Member, Board of Trustees, Fulbright University Vietnam, May, 2018 – 2019.
Member, Research Innovation and Enterprise 2020 (RIE2020) Energy Sub-Domain Mid-Term Review Panel, Singapore, October 2018.
Member, RIKEN Advisory Committee, Tokyo, Japan 2018-2020.
Co-Chair, InterAcademyPanel for Science, 2018 - 2021.

COMMERCIAL

Director, Newport Corporation, May 2014 - November, 2015.
Advisor, Xfund, January 2011 – 2015, and June 2017 to present.
Advisor, Materials-Alchemy, 2017 to present.

VOLUNTEER DEPARTMENT of ENERGY and NATIONAL LABS SERVICE

Member, Department of Energy (DOE) Basic Energy Sciences (BES) Advisory Committee, Subpanel on Neutron Scattering, 1999.
Member, University of Chicago Board of Governors for Argonne National Laboratory, 2000 – 2006.
Member, DOE BES Advisory Committee, 2000 – 2004.
Member, DOE Enrico Fermi Award Selection Committee, 2006.
Chair of Applied Science Panel, DOE BES Committee of Visitors for Materials Research, 2006.
Member, DOE BES Advisory Committee Science Grand Challenges Strategic Planning Committee, 2006.
Member, DOE National Nuclear Security Administration S&T Strategic Planning Group, 2006-2007.
Chair, Panel for Science and Technology Due Diligence of Los Alamos National Lab, 2006.
Member, Los Alamos National Security Science and Technology Committee, 2006 - 2009.
Member, Lawrence Livermore and Los Alamos National Security Benefits and Investment Committee, 2007 - 2008.
Member, Los Alamos National Lab External MaRIE Scientific Advisory Board, 2008 – 2014.
Chair, Los Alamos National Lab Energy Security External Advisory Panel, 2009 - 2013.
Consultant, Member of the Directorate Review Committee, Lawrence Livermore National Lab Weapons and Complex Integration Program, 2009 –2013.
Member, DOE Exascale Computation Panel, 2010.
Member, Blue Ribbon Panel on Materials R&D for Energy, 2010.

Member, Brookhaven Science Associates Governing Board, Brookhaven National Laboratory, 2011-2013.
Member, Los Alamos National Lab Director Search Committee, 2011.
Member, Lawrence Livermore National Lab Director Search Committee, 2011.
Chair, Los Alamos National Lab Principal Associate Director for Science, Technology and Engineering Search Committee, 2012.
Member, Secretary of Energy Advisory Board (SEAB,) 2013 - 2015.
Chair, SEAB Task Force on Evaluation of the new funding constructs for energy R&D, 2013-2014.
Chair, SEAB Revolutionary Working Group to produce a streamlined contract for a national lab, 2015.
Member, DOE Lawrence Award Selection Committee, 2013.
Member, DOE Enrico Fermi Award Selection Committee, 2014.
Member, Selection committee for the LLNL John S. Foster Jr. Medal, 2015.
Member, Thomas Jefferson National Lab Director's Strategic Advisory Committee, 2017 to present.
Member, Argonne National Laboratory Director's Science Advisory Board, 2018 – present.
Member, Triad Science Technology and Engineering Advisory Committee, Los Alamos National Laboratory, 2018- present.
Chair, committee for Basic Research Needs for Microelectronics Workshop and Panel Report, 2018-2019.
Chair, advisory committee to select DOE Distinguished Scientist Awards, June, 2019.

BELL LABORATORIES and LUCENT TECHNOLOGIES SERVICE

Member, Advisory Council on Research, AT&T Bell Labs 1982 - 1985.
Bell Laboratories Ph.D. Recruiter, 1984 – 1999.
Chair, Bell Laboratories Diversity Council, 1997 - 2001.
Executive Angel, M. I. T.– Lucent Technologies Relationship, 1999 – 2004.
Central Bell Labs representative on the Talent and Leadership Excellence Board, an across Lucent leadership development board for the corporation, 2001- 2004.
Site executive for the Lucent Technologies Murray Hill complex, OSHA Voluntary Protection Plan, 2002 -2004.

OTHER

Vice Chairman, Gordon Research Conference on Vibrational Spectroscopy, 1982.
Chairman, Gordon Research Conference on Vibrational Spectroscopy, 1984.
Advisory Board of International Raman Conference X, 1986.
Adjunct Professor of Physics, University of Houston, 1993 - 2000.
American Institute of Physics Corporate Associates Advisory Council, 1997 - 2000.
American Institute of Physics Visiting Scientist Program, 1988 - 2003.
Member, Condensed Matter Physics Sub Panel – Triennial Committee of Visitors Review, NSF, 1999.
Member, Panel of Judges for the MIT Technology Review TR-100 Innovation Awards, 2001 – 2004, Judge for TR35 Awards 2006 -2008, 2012-2014.
Member, Executive Committee, Business Coalition for Educational Excellence, New Jersey Chamber of Commerce, 2001.

Co-chair of the academy member review panel for advanced materials and electronic devices research center proposals from the New Jersey research universities for the New Jersey Commission on Jobs and Economic Growth, 2003. .

Discussion Leader, Nanoscale Science, Engineering and Technology (NSET) Grand Challenges Workshop on Nanoscale Energy Needs, 2004.

Discussion Leader, NSET Research Directions II Workshop, 2004.

Member, American Association for the Advancement of Science Board, 2008 -2011.

Chair elect of Physics Section, American Association for the Advancement of Science, 2007.

Chair, Physics Section, AAAS, 2008. Program Committee, AAAS, 2007-2010.

Co-chair, National Science Foundation Panel on Future Lightsource Facilities, 2007 - 2008.

Member of the Draper Lab Council, 2011 – 2015.

Co-chair, National Science Foundation Division of Materials Research subpanel on Materials Facilities, 2013-2014.

Member, American Physical Society, American Chemical Society, American Association for the Advancement of Science, Materials Research Society, National Academy of Sciences, American Academy of Arts and Sciences, National Academy of Engineering.

Over 75 technical papers published, 2 patents. References upon request.

Background

Excellent health, US Citizen, one child born October 1986, one child born September 1991.

Traveled extensively. My father was in the US foreign service and I lived overseas with my parents as a child.