Enhancing the U.S. Chemical Economy through Investments in Fundamental Research in the Chemical Sciences

Committee

Mark S. Wrighton

Chair

Mark S. Wrighton (Chair), is the James and Mary Wertsch Distinguished University Professor and Chancellor Emeritus at Washington University in St. Louis. From 1995 to 2019 he served as the 14th Chancellor and chief executive officer of the University. Previously, Dr. Wrighton served on the chemistry faculty at the Massachusetts Institute of Technology, 1972 until 1995, and from 1990 to 1995 he was Provost. He earned a BS degree in chemistry from Florida State University in 1969 and a PhD in chemistry from the California Institute of Technology in 1972. Dr. Wrighton's research interests are in the areas of transition metal catalysis, photochemistry, surface chemistry, molecular electronics, and photoprocesses at electrodes. He received the Pure Chemistry Award in 1981 and the Award in Inorganic Chemistry in 1988 from the American Chemical Society. He 1983 he was awarded a MacArthur Prize Fellowship and the E. 0. Lawrence Award from the United States Department of Energy. He is a Fellow of the American Academy of Arts and Sciences, a Fellow of the American Association for the Advancement of Science, and a member of the American Philosophical Society.

Cathy L. Tway

Vice Chair

Cathy Tway (Vice Chair), is the Technology and Applications Director for Catalyst Technologies at Johnson Matthey. In this role, she is responsible for a global team of scientists and engineers specializing in catalysis, process technologies, and engineering design. Additionally, Dr. Tway provides technical input, oversight, and direction as well as ensures that customer driven R&D and engineering are delivered efficiently. Prior to joining Johnson Matthey, Dr. Tway held positions at Dow, Celanese, Solutia, and Akzo Nobel, holding both R&D leadership and individual contributor roles. Dr. Tway has more than 25 years of industrial experience that covers the entire catalyst project life cycle including front-end opportunity identification and creation of new technologies, process scale-up, commercialization and plant support. Over her career, she has commercialized two new inorganic materials and four catalyst technologies, with two of these processes still in use today. She has served on numerous review panels, boards and committees including the committee for the National Academies of Sciences consensus study report, Gaseous Carbon Waste Streams Utilization. She earned her PhD in physical inorganic chemistry from the University of Nebraska-Lincoln.

Ashish Arora

Member

Ashish Arora is the Rex D. Adams Professor of Business Administration at the Fuqua School of Business at Duke University. Previously, he was a faculty member at Carnegie Mellon University, where he held the H. John Heinz Professorship until 2009. His research focuses on the economics of technology and technical change. Dr. Arora's research has included the study of technology intensive industries such as software, biotechnology and chemicals, the economics of information security, and the role of patents and licensing in promoting technology startups. He has studied the rise of the software industry and the pharmaceutical industry in emerging economies. His current research focuses on the management of intellectual property and licensing in corporations, and innovation-based entrepreneurship. He served, as co-editor of Research Policy from 2008-2014, and is currently serves as the Department Editor for Management Science (Innovation and Entrepreneurship) as well as on the editorial board of Strategic Management Journal. In the past, he has served on advisory panels to the Secretary of Commerce, the National Academy of Sciences, and the Association for Computing Machinery. Dr. Arora received his PhD in economics from Stanford University in 1992

Raychelle Burks

Member

Raychelle Burks is an Associate Professor of Chemistry at American University. Her research focuses on developing targeted, tech-tunable sensing systems for use in the lab and in the field to detect compounds of forensic interest. She has contributed to projects that aim to bring sensing systems to the market. Dr. Burks was awarded the 2020 American Chemical Society Grady-Stack award for excellence in public engagement. Dr. Burks earned her PhD in chemistry from the University of Nebraska-Lincoln in 2011.

Joseph M. DeSimone

Member

Joseph M. DeSimone, NAE, NAM, NAS, is a professor at Stanford University with appointments in the School of Medicine, School of Engineering, and the Graduate School of Business (by courtesy). Dr. DeSimone is also the Board Chair of Carbon, Inc., a 3D printing company he co-founded in 2013 and of which he served as CEO until 2019. Prior to co-founding Carbon, DeSimone was a professor at the University of North Carolina at Chapel Hill (UNC) and North Carolina State University (NC State) for over 25 years. Today, he maintains affiliations at UNC as the Chancellor's Eminent Professor of Chemistry Emeritus and at NC State as the William R. Kenan, Jr. Distinguished Professor of Chemical Engineering Emeritus. Dr. DeSimone has made scientific breakthroughs in areas including green chemistry, new polymer materials, medical devices, nanotechnology, and 3D printing, also co-founding several companies based on his research in addition to Carbon. In recognition of his achievements, he has received major accolades including the U.S. Presidential Green Chemistry Challenge Award, the Lemelson-MIT Prize, the American Chemical Society Award for Creative Invention, the National Academy of Sciences Award for Convergent Science, the EY Entrepreneur of the Year award, and the U.S. National Medal of Technology and Innovation. His previous service at the National Academies includes serving on the Academies Committee on Convergence in Biomedical Research, the Committee on Advancing Institutional Transformation for Minority Women in Academia, the Committee on Effectiveness of National Biosurveillance Systems: BioWatch and the Public Health System, as well as serving as Co-Chair and Member of the Materials Engineering Section Peer Committee Member, and Member of the Board on Chemical Sciences and Technology. Dr. DeSimone received his B.S. in Chemistry from Ursinus College and earned his PhD at Virginia Polytechnic Institute and State University in 1990.

Shanti Gamper-Rabindran

Member

Shanti Gamper-Rabindran is an associate professor at the University of Pittsburgh. Dr. Gamper-Rabindran applies her interdisciplinary training by working in the intersection of economic development, public health, and environmental and energy issues. She is the contributing editor of the Shale Dilemma: A Global Perspective on Fracking and Shale Development and author of US Energy Policy: Impacts on the Economy, People and Planet. Her research examines the effectiveness of policy instruments to improve health and safety and to reduce pollution (e.g. corporate social responsibility programs, information disclosure and regulations) and the impact of investments into public goods (e.g. hazardous waste cleanup on housing values and provision of piped water on infant mortality). She received the Faculty Award for Sustainability from the University of Pittsburgh in 2020. Dr. Gamper-Rabindran earned her PhD in economics from Massachusetts Institute of Technology.

Jeanette M. Garcia

Member

Jeannette Garcia is the Senior Manager for Quantum Applications, Algorithms and Theory team at IBM Research. Her team's research focuses on computational science applications and theory for quantum computing. Previously, Dr. Garcia's research interests have focused on the rational design of new polymers and materials, targeting recyclable materials with unique mechanical and thermal properties. When she first joined IBM Research in 2012, she worked on high performance and recyclable materials. She became a Research Staff Member in 2013 and from 2017-2018, served as the Technical Advisor to Dr. Sophie Vandebroek, Chief Operating Officer of IBM Research. From 2018-2019 she was a manager and Global Lead for Quantum Applications in Quantum Chemistry and Science. Dr. Garcia earned her PhD in Chemistry from Boston College, where she focused on catalyst design and development.

Javier Guzman

Member

Javier Guzman is currently the Global Research Guidance and Valuation Manager in Strategy and Planning for ExxonMobil Research and Engineering. Dr. Guzman leads a group that provides active guidance to technology program planning, prioritization, and decisions. Dr. Guzman worked in academia for four years before starting his industrial career in 2009. During his 11-year industrial career, he has served in a number of technical leadership and management assignments. Dr. Guzman is a leader in research and development, specifically in the area of catalysis and separations for sustainable chemicals and fuels. He obtained his PhD in chemical engineering from the University of California at Davis in 2003.

Martha Head

Member

Martha Head is the Director of the Joint Institute for Biological Sciences, a collaborative research effort between Oak Ridge National Laboratory (ORNL) and the University of Tennessee system. As director, she is focused on applying the world-leading capabilities of ORNL and UT to biomedical research and health outcomes of relevance to Tennessee and the Appalachian region. Before joining ORNL, Dr. Head spent 20 years in R&D at GlaxoSmithKline Pharmaceuticals (GSK). For many of those years, Dr. Head led GSK’s U.S. Computational Chemistry team, whose accountability was to proactively and creatively apply all relevant computational tools to progressing drug discovery efforts from target selection through to selection of a candidate for clinical trials. While at GSK, Dr. Head was a co-creator of the Accelerating Therapeutics for Opportunities in Medicine (ATOM), a public-private partnership under the auspices of the Cancer Moonshot, and at ORNL continues to be a contributor to ATOM and a member of the ATOM Joint Research Council, and Dr. Head leads the “Molecular design and analysis to inform therapeutics related to COVID-19” project sponsored by the US Department of Energy National Virtual Biotechnology Laboratory. Dr. Head received her PhD in physical chemistry from Duke University in 1995.

Kristala L. Prather

Member

Kristala L. J. Prather is the Arthur D. Little Professor and Executive Officer of the Department of Chemical Engineering at Massachusetts Institute of Technology (MIT). Prior to joining MIT, Dr. Prather worked four years in BioProcess Research and Development at the Merck Research Labs. Her research interests are centered on the design and assembly of recombinant microorganisms for the production of small molecules, with additional efforts in novel bioprocess design approaches. She particularly focuses on the elucidation of design principles for the production of unnatural organic compounds with engineered control of metabolic flux within the framework of the burgeoning field of synthetic biology. Dr. Prather is the recipient of an Office of Naval Research Young Investigator Award, a Technology Review “TR35” Young Innovator Award, a National Science Foundation CAREER Award, the Biochemical Engineering Journal Young Investigator Award, and the Charles Thom Award of the Society for Industrial Microbiology and Biotechnology. Additional honors include selection as the Van Ness Lecturer at Rensselaer Polytechnic Institute, and a named Fellow at the Radcliffe Institute for Advanced Study, the American Association for the Advancement of Science, and the American Institute for Medical and Biological Engineering. She earned her PhD from the University of California, Berkeley in 1999.

Jason Sello

Member

Jason Sello is a professor in the Department of Pharmaceutical Chemistry at the University of California, San Francisco (UCSF). Prior to his appointment at UCSF, Dr. Sello was a professor in the department of chemistry at Brown University. Before his first faculty appointment, he investigated RNA processing in Streptomyces bacteria using genetic tools as a visiting scientist at the John Innes Centre in Norwich, England, and also studied enzymes catalyzing antibiotic biosynthesis as a post-doctoral research fellow at Harvard Medical School. In his independent career, Dr. Sello has been creatively using experimental methods from chemistry, biophysics, biochemistry, and genetics to study biological phenomena and to develop new therapeutics for infections, cancer, and neurological disorders. He has also worked on technologies for the conversion of plant biomass into commodity chemicals. He has been the recipient of several awards, including career awards from the Burroughs Welcome Fund and the National Science Foundation. In 2013, Dr. Sello was recognized with a year-long appointment at Massachusetts Institute of Technology as the Martin Luther King, Jr. Visiting Professor of Biology. Currently, he serves on the anti-microbial resistance and drug discovery study section at the National Institute of Allergy and Infectious Diseases, and is a founding co-editor of Synthetic and Systems Biology. He earned a PhD in biophysics from Harvard University in 2002.

Bala Subramaniam

Member

Bala Subramaniam is the Dan F. Servey Distinguished Professor of Chemical Engineering at the University of Kansas (KU). Dr. Subramaniam is the founding Director of the Center for Environmentally Beneficial Catalysis (CEBC), a unique University-Industry consortium that is developing and providing licensing opportunities for novel resource-efficient technologies related to fuels and chemicals. Dr. Subramaniam's primary research interests are in catalysis and reactor engineering with emphasis on developing sustainable processes for fuels and chemicals from both traditional and renewable feedstocks. Dr. Subramaniam is the executive editor of ACS Sustainable Chemistry and Engineering journal and chaired the 2018 Gordon Research Conference on Green Chemistry. His honors include ASEE's Dow Outstanding Young Faculty Award, Indian Institute of Chemical Engineers' Chemcon Lectureship Award, and KU's Higuchi Research Achievement Award. Dr. Subramaniam is a Fellow of the AIChE, the ACS Industrial & Engineering Chemistry Division, and the National Academy of Inventors. He earned his PhD in chemical engineering from the University of Notre Dame in 1984.

Jean W. Tom

Member

Jean Tom, NAE, is currently Executive Director in Chemical Process Development, a group focused on developing enabling and commercial processes to manufacture small molecule drug substances at Bristol Myers Squibb (BMS). Previously, she worked on the process development of such molecules at Merck. Her research interests are in driving new approaches to more efficiently develop compounds, drawing upon opportunities using modeling, high throughput experimentation, and enabling technologies. She is active in external organizations driving innovations in the pre-competitive collaboration for pharmaceutical development (Enabling Technologies Consortium) and supporting the chemical engineering discipline as well as efforts at BMS to attract women students to STEM fields. Dr. Tom was a member of the NAS Board of Chemical Science & Technology from 2010-2013, and was elected to the National Academy of Engineering in 2019. She received her PhD in chemical engineering from Princeton University in 1993.