

Board on Chemical Sciences and Technology

Committee

Anup K. Singh

Chair

Anup K. Singh (chair) is the Principal Associate Director for Engineering at Lawrence Livermore National Laboratory. In this position, he leads an organization of about 3,000 professionals responsible for the Laboratory's engineering needs, including the design and manufacturing of components and integrated systems, as well as providing engineering tools and services. The Engineering organization also focuses on innovations through cutting-edge R&D and managing advanced facilities and tools in areas such as advanced manufacturing, optical and laser engineering, pulsed power systems, micro- and nano-technology, digital engineering, and autonomous systems. Before joining LLNL in early 2021, Anup spent two decades at Sandia National Laboratories in various technical and management roles, ultimately serving as the Director for the Center for WMD Defense and Energy Technologies. Singh is also an adjunct professor at the University of Texas Medical Branch in Galveston and serves as the Director of Microfluidics at the Joint BioEnergy Institute, a DOE-funded Bioenergy Research Center. Singh has gained international recognition for his contributions to biodefense, bioenergy, and bioengineering research. He has published over 100 peer-reviewed articles, delivered more than 150 presentations at conferences, and holds over 40 patents and patent applications. Several of his inventions have been licensed to companies specializing in medical diagnostics and sensor technology development.

Raychelle Burks

Member

Raychelle Burks is an Associate Professor at American University in Washington, DC. Her research focuses on developing field-ready sensing systems that target compounds of forensic and national security interest. Prior to becoming a professor, Burks worked in a crime lab and this experience continues to inform her research. She has contributed to projects aiming to bring sensing systems to market. Across a variety of media, Burks is a well-known science communicator and was awarded the 2020 American Chemical Society (ACS) Grady-Stack award for excellence in public engagement. For exceptional contributions to chemistry and service to ACS, she was designated Fellow of the ACS. Committed to a more equitable STEMM ecosystem, Burks engages in significant service with local, national, and international focused on social justice and STEMM. For NAS, Burks has served on the Committee on Enhancing the U.S. Chemical Economy through Investments in Fundamental Research in the Chemical Sciences. Burks received a PhD in Chemistry from the University of Nebraska – Lincoln, a MS in Forensic Science from Nebraska Wesleyan University, and a BS in Chemistry from the University of Northern Iowa.

Rigoberto Castillo Advincula

Member

Rigoberto C. Advincula is a Governor's Chair Professor of Oak Ridge National Laboratory (ORNL) and the University of Tennessee, Department of Chemical and Biomolecular Engineering. He is also a Group Leader at the Center for Nanophase Materials Sciences (CNMS), ORNL. His area of expertise is in organic and polymer chemistry, nanomaterials, flow chemistry and reaction engineering, additive manufacturing, and biomaterials. He has led major projects including a machine learning (ML) flow chemistry lab at ORNL and advanced nanocomposite manufacturing with DOE. He is a Fellow of the National Academy of Inventors (NAI), Fellow of the American Chemical Society (ACS), Fellow of the Polymer Science and Engineering Division (ACS), Fellow of the Polymer Chemistry Division (ACS), Fellow of the Royal Society of Chemistry, and the NATAS 2023 Fellow. He has been appointed to the World Economic Forum, Advanced Materials Council. He has held several visiting Professor positions including Waseda University in Japan and the Max Planck Institute for Polymers (MPI-P) Research in Germany. He obtained his Ph.D. in Chemistry at the University of Florida and had Post-doctoral Positions at the MPI-P and Stanford University. He is passionate in mentoring students and establishing interdisciplinary STEM programs.

Leo Chiang

Member

Leo Chiang is a Senior Director at Corporate Technology of The Lubrizol Corporation. In this role, he leads the global Decision Science team toward enabling faster and more effective decision making across the enterprise, from faster product development, to process efficiency and productivity. Prior to joining Lubrizol, Dr. Chiang spent 24 years at The Dow Chemical Company. Most recently, he served as a Senior R&D Fellow in Core R&D, where he led the global R&D digital strategy, co-developed digital IP and monetization strategy, Generative AI and LLM strategy, and responsible AI principles. Dr. Chiang is on a mission to improve data science and statistics acumen for the workforce at all levels. He is proactive in working with universities to support data science education in chemical engineering and the broader STEM community. Over the past decade, he served as a Computer Aid for Chemical Engineering (CACHE) trustee (2019-2024) and held a number of American Institute of Chemical Engineers (AIChE) leadership positions, including Executive Board of the Program Committee (EBPC) chair (2022), spring meeting program chair (2018), Industry 4.0 topical conference chair (2018-2020), Big data analytics topical conference chair (2015-2017), and Computing and Systems Technology (CAST) director (2014-2016). Dr. Chiang was elected to the National Academy of Engineering (NAE) in 2023. He is currently a board member of the National Academies' Board on Chemical Sciences and Technology (BCST) and program chair of 2026 Foundations of Process/Product Analytics and Machine learning (FOPAM) meeting. He is a Fellow of AIChE and has received many recognitions including the 2016 Herbert Epstein Award, 2016 Computing Practice Award, and American Automatic Control Council 2020 Control Engineering Practice Award. Dr. Chiang has co-authored 2 books, published over 70 externally referred journal and proceedings papers, and delivered over 160 conference presentations and university lectures. His work has achieved substantial external impact, with over 8,500 citations according to Google scholar. Dr. Chiang holds a B.S. degree from University of Wisconsin at Madison and M.S. and Ph.D. degrees from the University of Illinois at Urbana-Champaign in Chemical Engineering.

John Fortner

Member

John Fortner is an Associate Professor at Yale University within the Department of Chemical and Environmental Engineering. His research program is focused on advancing water-related technologies and understanding/engineering interfacial processes, typically at the nanoscale, as they relate to critical environmental-based health, security, and energy challenges. Dr. Fortner held postdoctoral fellowships at Rice University and the Swiss Federal Institute of Technology in Zurich (ETHZ). He obtained his BS from Texas A&M University and PhD from Rice University in environmental engineering.

Martha Head

Member

Martha S. Head (Marti) is Executive Director of Computational and Data Sciences at Amgen, where she leads a team applying mechanistic and machine-learning computational methods to the understanding of disease biology and the discovery and design of biologic and synthetic therapeutics. Previously, she was at Oak Ridge National Laboratory (ORNL), where she was Director of Computational Biomedical Initiatives and Director of the Joint Institute for Biological Sciences, a collaborative research effort between and the University of Tennessee system. 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. Dr. Head led GSK's collaboration with Palantir, a Silicon Valley data integration and exploration company, and built GSK's Insights from Data team. Dr. Head received her PhD in physical chemistry from Duke University in 1995.

Jennifer M. Heemstra

Member

Jennifer M. Heemstra received her B.S. in Chemistry from the University of California, Irvine, in 2000. At Irvine, she performed undergraduate research investigating the folding of synthetic beta-sheet mimics, which instilled in her a love of supramolecular chemistry. She then moved to the University of Illinois, Urbana-Champaign, where she completed her Ph.D. in 2005 studying the reactivity of pyridine-functionalized phenylene ethynylene cavitands. After a brief time in industry as a medicinal chemist, she moved to Harvard University to pursue postdoctoral research exploring mechanisms for templated nucleic acid synthesis. Dr. Heemstra began her independent career in 2010 and is currently the Charles Allen Thomas Professor and Chair of Chemistry at Washington University in St. Louis. Research in the Heemstra lab is focused on harnessing the molecular recognition and self-assembly properties of biomolecules for applications in biosensing and bioimaging. Specific accomplishments include the development of methods for high-throughput enantiopurity measurement for biocatalyst evolution, design of new stimuli-responsive biomaterials, and creation and use of tools to probe RNA localization and editing. In addition to her research, Dr. Heemstra is also actively engaged in science communication, outreach, and advocacy via her social media presence, advice columns and podcasts, and frequent seminars and workshops on topics surrounding mentoring, DEI, mental health, and science communication. Dr. Heemstra has been recognized with multiple awards, including the ARO Young Investigator Award, NSF CAREER Award, Cottrell Scholar Award, and ACS WCC Rising Star Award.

Jodie Lutkenhaus

Member

Jodie L. Lutkenhaus is the William and Ruth Neely Faculty Fellow and an Associate Professor in the Artie McFerrin Department of Chemical Engineering at Texas A&M University. Dr. Lutkenhaus also holds a courtesy appointment in the Department of Materials Science and Engineering. Following a postdoctoral position at University of Massachusetts Amherst, she joined the faculty at Yale in 2008. In 2010, she moved to Texas A&M University and was later promoted to Associate Professor in 2015. Dr. Lutkenhaus has served on the Editorial Advisory Boards of Macromolecules, American Chemical Society Macro Letters, and American Chemical Society Applied Nano Materials. She has also served on the Editorial Board of Scientific Reports. She previously served in the American Chemical Society Division of Polymeric Materials: Science and Engineering as Member-at-Large and in the American Institute of Chemical Engineers Materials and Engineering Science Division as 2nd Vice Chair. Dr. Lutkenhaus received her BS in Chemical Engineering in 2002 from The University of Texas at Austin and her PhD in Chemical Engineering in 2007 from the Massachusetts Institute of Technology.

Shelley D. Minter

Member

Shelley D. Minter is an Associate Chair of Chemistry and the Dale and Susan Poulter Endowed Chair of Biological Chemistry in the Department of Chemistry at the University of Utah. She received her B.S. in Chemistry from Western Illinois University in 1995 and her Ph.D. in Analytical Chemistry from the University of Iowa in 2000 under the direction of Professor Johna Leddy. After receiving her Ph.D., she spent 11 years as a faculty in the Department of Chemistry at Saint Louis University before moving to the University of Utah in 2011. She was a Technical Editor for the Journal of the Electrochemical Society (2013-2016) and also an Associate Editor for the Journal of the American Chemical Society (2016-2020) before serving as the inaugural Editor-in-chief of the ACS Au Journals (2020-present). Dr. Minter has published more than 400 publications and given over 500 presentations at national and international conferences and universities. She has won several awards and fellowships, including the Luigi Galvani Prize of the Bioelectrochemical Society, the International Society of Electrochemistry Tajima Prize and Bioelectrochemistry Prize, the Grahame Award of the Electrochemical Society, Fellow of the Electrochemical Society and the International Society of Electrochemistry, the American Chemical Society Division of Analytical Chemistry Award in Electrochemistry, and the Society of Electroanalytical Chemists' Young Investigator Award and Reilly Award. Her research interests are focused on electrocatalysis and bioanalytical electrochemistry. She has expertise in biosensors, biofuel cells, electrosynthesis, and bioelectronics.

Amy Prieto

Member

Amy Lucía Prieto is a Professor of Chemistry at Colorado State University, and the Founder/CTO of Prieto Battery, Inc. She received her B.A. from Williams College in Chemistry and Philosophy, her Ph.D. in Inorganic Chemistry from the University of California, Berkeley, and did her postdoctoral work at Harvard University. There she was named one of the first L'Oreal for Women in Science Fellows. Her research is focused on developing synthetic methods for materials that have application in energy storage and production, with a particular emphasis on sustainability. She is a member of the Royal Society of Chemistry, is an Associate Editor for the journal Chemical Communications, and has been awarded a Presidential Early Career Award for Scientists and Engineers (awarded by President Barack Obama).

Megan L. Robertson

Member

Megan L. Robertson is the Cullen College of Engineering Associate Professor in the William A. Brookshire Department of Chemical & Biomolecular Engineering at the University of Houston. Dr. Robertson received her Ph.D. in Chemical Engineering from the University of California, Berkeley and subsequently worked as a Senior Scientist at Rohm and Haas (now Dow Chemical) in Spring House, Pennsylvania. She then went to the University of Minnesota as a Postdoctoral Research Associate in the Department of Chemistry before joining the University of Houston. Dr. Robertson's research interests span diverse areas including sustainable polymers derived from renewable resources, biodegradable polymers and polymer end-of-life, advanced resins for polymer composites, structure and dynamics of block copolymer micelles, antifouling polymers and polymer brushes, and thermodynamics of polymer blends. Dr. Robertson is the recipient of the Sparks-Thomas Award of the American Chemical Society, an Editor of the European Polymer Journal, and an advisory board member for the National Institute of Standards and Technology Center for Neutron Research, Center for Plastics Innovation, Center for Sustainable Polymers, ACS Applied Polymer Materials, and Polymer Chemistry (RSC). Dr. Robertson was formerly an organizer and participant of Frontiers of Science Kavli symposia sponsored by the National Academy of Science.

Vijay Swarup

Member

Vijay Swarup is Vice President of Research and Development at ExxonMobil Research and Engineering Company. One of his many research interests include the challenge of how to capture carbon dioxide before it is released into the atmosphere. Over his career, he has progressed through a variety of engineering, planning and managerial roles at company locations in Redwater, Alberta, Canada; Baytown, Texas; Baton Rouge, Louisiana; Houston, Texas; and Fairfax, Virginia. In 2006, he became the Global Technology Planning Manager for ExxonMobil Chemical. In 2008, he was appointed Global Olefins Marketing Manager for ExxonMobil Chemical Company. In 2010 he became Vice President of Basestocks, Specialties and Asphalt for ExxonMobil Lubricants and Specialties Company. He was appointed Manager of Planning and Business Development for ExxonMobil Chemical in 2012. In 2013, Dr. Swarup was appointed Corporate Strategic Research Manager, ExxonMobil Research and Engineering Company. In 2014, he was appointed Vice President, Research and Development, ExxonMobil Research and Engineering Company. Vijay holds BS degrees in Chemistry and in Chemical Engineering from Purdue University and a PhD in Chemical Engineering from Rutgers University.

Cathy L. Tway

Member

Cathy Tway is BP's Senior Director for Chemistry and Catalysis, where she is focused on innovation delivery of BP's growth engines portfolio. Prior to joining BP, Cathy held positions at Johnson Matthey, Dow, Celanese, Solutia, and Akzo Nobel. Her industrial experience of more than 25 years covers the entire catalyst project life cycle including front-end opportunity identification and creation of new technologies, process scale-up, commercialization, licensing, and plant support. Over her career, Cathy 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 serving as Vice Chair for the U.S. National Academies of Sciences, Engineering, and Medicine consensus study report on "The Importance of Chemical Research to the U.S. Economy" and serving on the U.S. Department of Energy Basic Energy Sciences Advisory Committee. She earned her B.S. degree in chemistry from Wichita State University and Ph.D. in physical inorganic chemistry from the University of Nebraska-Lincoln.