

The National Academies of
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Division on Engineering and Physical Sciences
Laboratory Assessments Board
Committee on NIST Technical Programs

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Biographical Sketches

Chair

ELSA REICHMANIS (NAE) is Brook Byers Professor of Sustainability and professor, in the School of Chemical and Biomolecular Engineering at the Georgia Institute of Technology. Prior to joining Georgia Tech she was Bell Labs Fellow and Director of the Materials Research Department, Bell Labs, Murray Hill, NJ. Dr. Reichmanis has received several awards for her work. She has also been active in professional societies; she served as 2003 president of the American Chemical Society and has participated in many Academies activities. Her research, at the interface of chemical engineering, chemistry, materials science, optics, and electronics, spans from fundamental concept to technology development and implementation. Her interests include the chemistry, properties and application of materials technologies for photonic and electronic applications, with particular focus on polymeric and nanostructured materials for advanced technologies. Currently, efforts aim to identify fundamental parameters that will enable sub-nanometer scale dimensional control of organic, polymer, and/or hybrid semiconductor materials. Such control will be required if organic technologies are to meet the vision and expectations for flexible, printed electronic devices and display technologies, and low-cost, light-weight, and portable materials for energy storage and conversion. The over-riding goal of the Reichmanis laboratory relates to the control of materials morphology through molecular design, synthesis, and process engineering. Dr. Reichmanis received her B.S. in chemistry and her Ph.D. in organic chemistry from Syracuse University.

Members

MICHAEL BASKES (NAE) is a professor at Bagley College of Engineering at Mississippi State University. Dr. Baskes's interests encompass the use of computational methods to investigate material properties. His major scientific accomplishments have been development of the embedded atom method, development of models to predict the behavior of helium in metals, and development of a model to explain hydrogen isotope recombination. Prior to his current professorial position, Dr. Baskes was employed at Sandia, Livermore, and Los Alamos National Laboratories; the University of California, San Diego; and the University of North Texas. Dr. Baskes earned a B.S. degree in engineering and a Ph.D. in materials science from the California Institute of Technology.

LEWIS M. BRANSCOMB (NAS/NAE/NAM) is professor emeritus in the John F. Kennedy School of Government at Harvard University and adjunct professor in the School of International Relations and Pacific Studies at the University of California, San Diego. Dr. Branscomb's field of major interest is science and technology policy in the

U.S., at both federal and state levels, and internationally, especially within Korea, Mexico, South Africa, China, and Japan, and the management of scientific and technological activities in both the public and private sectors. He is also interested in policy relating to information infrastructure and computer technology; studies of industrial innovation, its management, and links to research; and the role of scientific advice in public decision making. Dr. Branscomb received the A.B. in physics and mathematics from Duke University and an M.A. and Ph.D. in physics from Harvard University.

MARTIN E. GLICKSMAN (NAE) is Allen S. Henry Chair and University Professor of Engineering in the Department of Mechanical and Aerospace Engineering at the Florida Institute of Technology. Dr. Glicksman and his colleagues and students have conducted fundamental research on energy and solutal transport during solidification and crystal growth for over thirty-five years, concentrating on the development of scaling laws for microstructure formation and evolution. He and his co-authors have published over 200 papers and monographs in the area of solidification processing, microstructure evolution, and crystal growth. He has measured interfacial energies and other basic thermodynamic properties of crystal-melt systems, studied the detailed flow interactions between crystals and their melts, and, most recently, characterized the influence of gravity on dendritic and eutectic solidification. Professor Glicksman has held positions on national committees and panels dealing with microgravity research. Dr. Glicksman received the B.S. in metallurgical engineering and the Ph.D. in physical metallurgy from Rensselaer Polytechnic Institute.

JENNIE S. HWANG (NAE) is CEO of H-Technologies Group, and board trustee and distinguished adj. professor at Case Western Reserve University. Her career encompasses corporate and entrepreneurial businesses, international collaboration, research management, technology transfer and global leadership positions, as well as corporate and university governance. Among her many honors and awards are U.S. Congressional Certificates of Recognition; induction into International Hall of Fam – Women in Technology and Ohio Women Hall of Fame; named the R&D-Stars-to-Watch; Distinguished Alumni Awards; Honorary Doctoral degree; and YWCA Achievement Award. She was the CEO of International Electronic Materials Corp. and has held senior executive positions with Lockheed Martin Corp., Hanson, PLC and Sherwin-Williams Co. and co-founded entrepreneurial businesses. She is internationally recognized as a pioneer and long-standing leader in the infrastructure development of electronics miniaturization and green manufacturing. She has served as Global President of the Surface Mount Technology Association and in other global leadership positions. An international speaker and author of 475+ publications including several internationally-used books, she has lectured to tens of thousands of managers, engineers and researchers on professional development courses. Her speeches range from university commencement addresses to keynote at DoD Federal Women's Program to tutorials at the U.S. Patent and Trademark Office. She is also a prolific author and speaker on education, workforce, and social and business issues. Additionally, Dr. Hwang has served as a board director for Fortune 500 NYSE-traded and private companies and various university and civic boards, and on the International Advisory Board of the Singapore Advanced Technology and Manufacturing Institute and a number of international industry boards. On serving the National Academies, she chairs the Technical Assessment Board of Army Research Laboratory, and has served

as NAE Membership Search Executive (Materials Section), National Materials and Manufacturing Board, DoD R&D Globalization Board, Committee on Forecasting Future Disruptive Technologies and NAE Award Committee, among others. She also has served as a reviewer for National Academies Reports and other national/international publications. Her formal education include Harvard University Executive Program, Columbia University Business School Governance Program, and four academic degrees (Ph.D., M.A., M.S., B.S.) in Materials Science and Metallurgical Engineering, Chemistry, and Liquid Crystal Science. The Dr. Jennie S. Hwang Award for Faculty Excellence was established at her Alma Mater. The Dr. Jennie S. Hwang YWCA Award is established in her honor, now for 17 years running, to encourage and recognize outstanding women students in STEM, Further info: www.JennieHwang.com.

CHRISTOPHER MACOSKO (NAE) is Director of the Industrial Partnership for Research in Interfacial and Materials Engineering and professor of chemical engineering and materials science at the University of Minnesota. He has advised over 100 M.S. and Ph.D. students and postdoctoral researchers with whom he has published over 500 papers in rheology and polymer processing, particularly processing with reaction such as reaction injection molding, polyurethane foam, crosslinking and reactive compatibilization of polymer blends. This research has been recognized with numerous awards including the Bingham medal of the Society of Rheology. He co-founded Rheometric Scientific, now part of TA Instruments, which is a leading producer of rheological instruments. His rheology textbook *Rheology: Principles, Measurements, and Applications* (Wiley, 1994) is widely used. Dr. Macosko received the B.S. from Carnegie Mellon, M.Sc. from Imperial College, London, and Ph.D. from Princeton—all in chemical engineering.

C. KUMAR N. PATEL (NAS/NAE) is professor of physics, chemistry, and electrical engineering at University of California, Los Angeles. Simultaneously, he is the founder, CEO and President of the Board of Pranalytica, Inc., a Santa Monica-based company that is commercializing highly sensitive and selective trace gas sensors and high-power quantum cascade lasers for commercial, homeland security, and defense markets. From March 1993 to December 1999, he was the Vice Chancellor of Research at UCLA. Until joining UCLA in March 1993, he was Executive Director, Research, Materials Science, Engineering and Academic Affairs Division at AT&T Bell Laboratories in Murray Hill, New Jersey. His work at AT&T Bell Laboratories led to the creation of the field of high-power molecular lasers, infrared nonlinear optics, ultra-small absorption measurement techniques for gases, solids, and liquids, and laser surgery. He is the inventor of the carbon dioxide laser. He has authored/coauthored over 240 publications and has been awarded 44 U.S. patents. In 1980, Dr. Patel was elected an honorary member of the Gynecologic Laser Surgery Society, and in 1985, he was elected an honorary member of the American Society for Laser Medicine and Surgery. He is the past president of the American Physical Society (1995) and Sigma Xi, the Scientific Research Society (1993-1995). He co-chaired (with N. Bloembergen) the American Physical Society Study of the Science and Technology of Directed Energy Weapons. Dr. Patel received his B.E. in telecommunications from the College of Engineering in Poona, India. He received M.S. and Ph.D. in electrical engineering from Stanford University.

BHAKTA B. RATH (NAE) is head of the Materials Science and Component Technology Directorate and Associate Director of Research at the Naval Research Laboratory (NRL). In his current position, Dr. Rath manages a multidisciplinary research program to discover and exploit new improved materials, generate new concepts associated with materials behavior, and develop advanced components based on these new and improved materials and concepts. Scientists in this directorate perform theoretical and experimental research to determine the scientific origins of materials behavior and to develop procedures for modifying these materials to meet naval needs for advanced platforms, electronics, sensors, and photonics. Dr. Rath earned an M.S. in metallurgy from Michigan Technological University and received a Ph.D. from the Illinois Institute of Technology in metallurgy and material sciences.

ALICE WHITE is a professor and chair of the Department of Mechanical Engineering at Boston University. Professor White came to Boston University in September 2013 from Bell Labs, where she was Chief Scientist. In addition to being a Bell Labs Fellow, she is a Fellow of the American Physical Society, the Optical Society of America, and the IEEE. Her research career has spanned many areas with common themes in fabrication and materials. After a Ph.D. thesis and a postdoc looking at the physics of electronic transport in 1D metal wires at low temperatures, she moved into using high-dose ion implantation to synthesize materials, including implanting Co ions to make high-quality crystalline layers of CoSi_2 inside a silicon wafer. Switching fields, she worked on novel fiber devices, fabricating phase masks by reactive ion etching of glass to make fiber-Bragg-grating devices manufacturable. This led to a work in so-called “silicon optical bench” technology, which uses semiconductor processing techniques to create optical subassemblies for lasers and detectors as well as optical waveguide interconnects. Now at Boston University, she has established the Multiscale Laser Lithography Lab, which does research in nanoscale 3D printing using Direct Laser Writing. Dr. White earned a B.A. in physics from Middlebury College and an A.M. and Ph.D. in physics from Harvard University.