

Imagining the Future of Undergraduate STEM Education

Committee

Annette Parker

Co-Chair

ANNETTE PARKER is the president of South Central College, a Minnesota State community and technical college. She has been involved in manufacturing industry and workforce education for more than 35 years. She started her career at General Motors in Lansing, Michigan and moved into education first as a faculty member and administrator at Lansing Community College and later as System Director of Workforce Education for the Kentucky Community and Technical College System. In this role, she also served as executive director and principal investigator of the Automotive Manufacturing Technical Education Collaborative (AMTEC), a National Science Foundation Advanced Automotive Manufacturing Center of Excellence, which was selected by the National Governors Association as the 2011 Best Practice. Dr. Parker has served on President Obama's Advanced Manufacturing Partnership (AMP) Steering Committee 2.0 and co-chaired AMP's "Demand-Driven Workforce Development" work team. She has also sat on the boards of directors for the American Association of Community Colleges, National Coalition of Advanced Technology Centers, Center for Quality People and Organizations, and Corporate Voices for Working Families, as well as the SkillsUSA Corporate Board and National Career Pathways Network Advisory Board. She currently serves on the Center for Community College Student Engagement National Advisory Board, Council for Adult and Experiential Learning Advisory Council (Chair), NASEM Roundtable on Systemic Change in Undergraduate STEM Education, The Presidents' Roundtable (vice convenor) and Iowa-Minnesota Campus Compact Board of Directors (chair of MNCC and vice chair of IAMNCC) and on MIT's Work of the Future Task Force. She earned an A.A.S. in Industrial Drafting from Lansing Community College, a B.S. in Technical Education and a M.S. in Career and Technical Education from Ferris State University in Big Rapids, Michigan, and an Ed.D. in Educational Leadership from Western Kentucky University.

Barbara A. Schaal

Co-Chair

BARBARA SCHAAL (NAS) is dean of the Faculty of Arts and Sciences and Mary-Dell Chilton Distinguished Professor at Washington University in St. Louis. As dean of the faculty, she is responsible for the appointment, promotion, recommendation of tenure, and salary of all faculty members, as well as the appointments of the deans of the college, the graduate school, and university college. She oversees all academic, financial, and administration aspects of Arts and Sciences, including the development and implementation of strategic plans for faculty, students, and facilities. In her scientific career, Dr. Schaal is a nationally recognized plant evolutionary biologist. She uses DNA sequences to understand evolutionary processes such as gene flow, geographical differentiation, and the domestication of crop species. Dr. Schaal was among the first plant scientists to use molecular biology-based approaches to understand evolutionary processes in plants, and she has worked to advance understanding of plant molecular systematics and population genetics. Dr. Schaal has been president of the Botanical Society of America, the Society for the Study of Evolution, and the American Association for the Advancement of Science. She is an elected member of the American Academy of Arts and Sciences and US National Academy of Sciences, where she served as Vice President for 8 years. She was appointed as a US science envoy by former Secretary of State Hillary Clinton. Dr. Schaal has served as chair of the Division on Earth and Life Studies at the National Research Council and was a member of President Obama's Council of Advisors for Science and Technology from 2009-17. She graduated from the University of Illinois, Chicago, with a degree in biology, and received master's and doctoral degrees in population biology from Yale University.

Leanne Chukoskie

Member

LEANNE CHUKOSKIE is professor of social sciences at Minerva and assistant researcher in the Qualcomm Institute at the University of California, San Diego. She conducts research on the links between movement and cognition, especially during typical and atypical development. Her work spans both discovery research and translation. Most recently, she has focused on developing and testing behavioral therapeutics for individuals on the autism spectrum. Dr. Chukoskie has enjoyed mentoring many students in her research, and brings that mentorship perspective to her teaching. Her favorite part of teaching lies in helping students discover their own unique educational path for lifelong learning. She teaches the first-year Complex Systems Cornerstone and the Perception, Cognition, and Reality core course. She is PI for the National Science Foundation Science of Learning Coordinating Network: Learning to Move and Moving to Learn. She develops technologies to help assess and intervene in children with learning and developmental disorders, with a focus on measuring and using movement as part of these assessments and interventions. By creating engaging programs that support learning through improving these basic motor and cognitive skills, her research leverages a multitude of skills and disciplines to improve learning. In the Temporal Dynamics of Learning Center, she helped to bring together more than 40 faculty spanning neuroscience, engineering, computer science, and cognitive science to translate our understanding of how people learn into learning environments in schools as well as less formal settings. This intensely interdisciplinary experience has become central to her research goals. Dr. Chukoskie earned a dual major B.A. in biological basis of behavior and anthropology from the University of Pennsylvania and her Ph.D. in neuroscience from New York University.

Kinnis Gosha

Member

KINNIS GOSHA is a Hortenius I. Chenault Endowed Associate Professor in the Computer Science Department at Morehouse College. He is also the director of the nationally recognized Culturally Relevant Computing Lab. This lab is the largest producer of African American computer science undergraduates in the nation who go on to doctoral programs in computing. He was recently named the division chair of Experiential Learning and Interdisciplinary Studies, a new division at Morehouse College. With this new position, Dr. Gosha has the opportunity to work closely with academic program directors to facilitate programmatic, budgetary, and other decision-making within the division. He is also responsible for participating in student recruitment activities and fundraising for the division. In addition, he will work to promote a collegial work climate, facilitate and lead the division towards improved productivity and relevancy. Last summer he joined Dell, Inc. as a Diversity and Inclusion Summer Research Fellow to lead a study to uncover how companies can be successful with hiring and retaining diverse candidates. This research will help to inform the direction of strategic investments made by companies to empower and enable the workforce of the future. Using his expertise in designing conversational agents, Dr. Gosha worked on the development of Dell's Bias Check Embodied Conversational Agent prototype. He was an organizer of a workshop to develop strategies that address fairness, ethics, accountability, and transparency (FEAT) in computing based research, practice, and educational effects. The workshop was planned to bring together diverse researchers with FEAT-related expertise to explore best practices and integrate disparate approaches. He also has an NSF grant to conduct a study on virtual mentorship and how it impacts underrepresented minority students in the computer science and engineering fields. During his graduate studies, he spent four years in the Human-Centered Computing Lab at Clemson University as the team leader for NSF BPC-DP: Incorporating Cultural Tools for Math and Computing Concepts into the Boys and Girls Clubs of America Project. In addition, Dr. Gosha served in various instructor roles at Columbus State University and Auburn University. Prior to joining Morehouse College, he held positions at IBM Research, Auburn University, and Synovus Financial. He joined Morehouse College as an instructor in 2011. Dr. Gosha's primary research interests include expanding computer science education, broadening participation in computing, green computing, and culturally relevant computing. Undergraduate researchers in his lab, the Culturally Relevant Computing Lab, investigate research problems centered on creating innovative computing technologies to solve cultural problems and issues. Applications of his research include robotics, avatars, and video games. He owns Gosha Technologies, a website development company started in 2005. He earned a bachelor's in computer science from Albany State University, a master's in computer science from Auburn University, and a Ph.D. in human centered computing from Clemson University.

Nicholas Horton

Member

NICHOLAS HORTON is Beitzel Professor of Technology and Society and professor of statistics at Amherst College. Dr. Horton is an applied biostatistician whose work is based squarely within the mathematical and computational sciences but spans other fields in order to ensure that biomedical research is conducted on a sound footing. He has published more than 170 papers in the statistics and biomedical literature and 4 books on statistical computing and data science. He has taught a variety of courses in statistics and related fields, including introductory statistics, data science, probability, theoretical statistics, regression, and design of experiments. He is passionate about improving quantitative and computational literacy for students with a variety of backgrounds as well as engagement and mastery of higher level concepts and capacities to think with data. Dr. Horton received the American Statistical Association (ASA) Waller Award for Distinguished Teaching, the Mathematical Association of America Hogg Award for Excellence in Teaching, the Mu Sigma Rho Statistics Education Award, and the ASA Founders Award. He was a co-principal investigator of the National Science Foundation-funded Project MOSAIC, serves as the chair of the Committee of Presidents of Statistical Societies, is a fellow of the ASA and the American Association for the Advancement of Science, and was a research fellow at the Bureau of Labor Statistics. Dr. Horton earned an A.B. from Harvard College and an Sc.D. in biostatistics from the Harvard T.H. Chan School of Public Health.

Ryan Kelsey

Member

RYAN KELSEY is chief advisor to the President & CEO at Achieving the Dream, Inc (ATD). In this role, he works to continue strengthening ATD's internal capacity as an organization and its outreach to its network of colleges through strategic planning, the design of new products and services, and the scaling of key initiatives across the network. Dr. Kelsey comes to ATD from the Leona M. and Harry B. Helmsley Charitable Trust where he developed and managed a \$45 million portfolio of grants focused on U.S. higher education, STEM learning, K-12 teacher preparation, and educational technology. As part of his work with grants, he convened and supported experts on effective educational practices aimed at systemic improvement and formed networks of colleges and universities committed to campus-wide transformation, often with regional workforce and foundation partners. He was also a frequent speaker at national meetings on the importance of increasing the size and diversity of the STEM workforce. In addition to his focus on systemic change, his grants recognized the value of using external evaluations to increase project outcomes and help build the knowledge base in targeted areas. Of specific note, many of these investments supported work at America's community colleges, including important ATD work with colleges in integrated planning and advising, labor marker alignment, and improving adjunct faculty engagement. Before he joined the Helmsley Charitable Trust, Dr. Kelsey spent more than a decade at the Columbia University Center for New Media Teaching and Learning, serving as Director of Projects and Associate Director of Education & Research. In those roles, he co-led the Center's strategic planning and new programs. He also led the Center's research and evaluation efforts, advising staff on evaluation methods and leading workshops for university faculty. He taught graduate courses in educational technology and instructional design at Teachers College, Columbia University, and at New York University as well as introductory undergraduate science at Columbia. Dr. Kelsey earned an Ed.D. and M.A. in communication and education from Teachers College, Columbia University, and a B.S. in biology from Santa Clara University.

Kirk Kolenbrander

Member

KIRK KOLENBRANDER is executive vice president, College of Engineering, Technology, and Aeronautics (CETA) at Southern New Hampshire University (SNHU). CETA was formed when SNHU took on students from Daniel Webster College in Nashua in 2016 when the school's parent company declared bankruptcy. Dr. Kolenbrander is leading the construction of a new innovative building on the main campus that will feature a makerspace, a 3D printing room, a drone flying area and unmanned aerial vehicle prep space, and a robotics lab. He is committed to helping SNHU to create a new, scalable model for higher education and wants to create a sustainable model that provides affordable, engaging learning experiences that help produce employees ready to contribute to companies on day one. Prior to joining SNHU, he first started working at the Massachusetts Institute of Technology (MIT) in 1990 as an assistant professor of electronic materials, becoming an associate professor in 1995. As a faculty member, he won the MIT Baker Award for Faculty Excellence in Undergraduate Teaching and the MIT Smith Award for Outstanding Faculty Contributions to Student Life, each of which is awarded annually to one member of the MIT faculty. In 1995, Dr. Kolenbrander led the creation of MIT LeaderShape, an intensive leadership curriculum he has taught during Independent Activities Period for nearly 25 years, providing more than 1,000 MIT students with a formative experience in community-centered problem solving. He was instrumental in forging a new partnership between the Institute and the MIT Alumni Association. He has also led efforts to introduce changes intended to enhance diversity and inclusion at MIT, including improvements related to orientation for incoming students, mental health services, implicit bias training, financial aid, and student surveys and data collection. Dr. Kolenbrander holds a Ph.D. in physical chemistry from the University of Illinois at Urbana-Champaign.

Arthur Lee

Member

ARTHUR LEE is a Chevron Fellow and principal advisor, Environment and Climate Change, at Chevron Services Company, based in San Ramon, California. He has held positions of increasing responsibilities, including the corporation-wide formulation of strategic positioning and policy development on issues ranging from Chevron's internal energy policy, U.S. air pollution issues, to actions addressing climate change concerns. Mr. Lee was appointed April 2010 by the U.S. Secretary of Commerce to the National Climate Assessment Development and Advisory Committee, responsible for the next assessment of climate change impacts on the United States. He is team leader on deployment issues in the CO₂ Capture Project, which is the global joint industry-governments project to develop the next generation of CO₂ capture and storage technology. From April 2005 to May 2007, he served as the chairman of the Climate Change Working Group of the International Petroleum Industry Environmental Conservation Association. Mr. Lee served as the review editor of the International Panel on Climate Change's (IPCC) Special Report on Carbon Dioxide Capture and Storage (2005). The IPCC shared the 2007 Nobel Peace Prize. In August 2006 and November 2007, with his leadership, Chevron was the key sponsor of the series of G8/International Energy Agency/Carbon Sequestration Leadership Workshop on Carbon Capture and Storage. The workshop series was successful in generating a consensus on recommendations for near-term opportunities for carbon capture and storage. These recommendations were delivered to G8 leaders. He earned a bachelor's in chemical engineering from MIT and a master's in chemical engineering from Caltech.

Cathryn A. Manduca

Member

CATHRYN A. MANDUCA is the Director of the Science Education Resource Center (SERC) at Carleton College and served for many years as the executive director of the National Association of Geoscience Teachers. This work supports communities of educators in learning together and collaborating to create resources supporting widespread improvement. The 30,000+ pages comprising the SERC websites are visited by more than 5 million visitors per year. She has nearly two decades of experience leading national programs to improve geoscience education and undergraduate STEM education. Dr. Manduca's research focuses on understanding faculty learning and the impact of professional networks on educational practice. She serves on the Board on Science Education and the LabX Advisory Board for the National Academies of Sciences, Engineering, and Medicine, and has served on the elected leadership for the American Geophysical Union and AAAS Education Section in the past. She is a fellow of the AAAS and Geological Society of America, and past recipient of the American Geophysical Union award for Excellence in Earth and Space Education. She received her B.A. in geology from Williams College and her Ph.D. in geology from the California Institute of Technology.

Christine Ortiz

Member

CHRISTINE ORTIZ is Morris Cohen Professor of Materials Science and Engineering at the Massachusetts Institute of Technology and Founder, Station1. Dr. Ortiz is a scientist, engineer, professor, scholar, former dean, philanthropist, and social entrepreneur. She is a distinguished scientist and engineer with over 175 scholarly publications, has supervised the research projects of more than 100 students from 10 different academic disciplines, and received 30 national and international honors, including the Presidential Early Career Award in Science and Engineering which was awarded to her at the White House by President George W. Bush. Ortiz served as the Dean for Graduate Education at MIT between 2010 and 2016, supporting approximately 7,000 graduate students from 100+ countries. With over 25 years of experience in higher education, Dr. Ortiz holds a tenured and chaired position and has led cross-institutional initiatives in diversity, equity, and inclusion, global education, technology-enabled learning, new methods of learning assessment, and postsecondary financial models. Ortiz has served on or chaired over 50 task forces, working groups, and committees in higher education. Ortiz served as a regional accreditation commissioner for the Commission on Institutions of Higher Education, New England Association of Schools and Colleges. Ortiz is the founder and inaugural philanthropic benefactor of a new nonprofit higher education institution, Station1 (www.station1.org), that is building a new model of postsecondary education through an inclusive, integrated, interdisciplinary approach to socially-directed science and technology education, research, and entrepreneurship. Ortiz has been active in shaping the national and international dialogue on higher education and has spoken at the National Science Foundation, the National Institutes of Health, the National Academies of Science, Engineering, and Medicine, The United Nations, the League of European Research Universities (a network of 23 leading European research universities), Semesp (a national organization for Brazilian Higher Education), and the American Association for Colleges and Universities, among many other venues. She obtained her B.S. from Rensselaer Polytechnic Institute and her M.S. and Ph.D. from Cornell University, all in the field of materials science and engineering, with a minor in theoretical and applied mechanics.

Josipa Roksa

Member

JOSIPA ROKSA is professor of sociology and education in the Department of Sociology and in the Department of Leadership, Foundations and Policy of the Curry School of Education at the University of Virginia. Her current research focuses on understanding the experiences and outcomes of first-generation and low-income students, and more broadly the role of socioeconomic status in shaping students' trajectories through both undergraduate and graduate education. In addition, she is examining how students' experiences vary by race/ethnicity, particularly in STEM fields. Current projects are charting coursework trajectories, considering the role of family support, and exploring students' interactions with faculty and peers, all with the goal of understanding the mechanisms that generate social inequality. In her earlier work, Dr. Roksa has explored inequalities in learning (and specifically development of critical thinking skills in college) and K-12 education. Alongside her faculty appointment in the Department of Sociology and Curry School of Education, Dr. Roksa serves as senior advisor for Academic Programs in the Office of the Executive Vice President and Provost. She holds a Ph.D. from New York University in sociology and a B.A. from Mount Holyoke College in psychology.

Lynn A. Stein

Member

LYNN ANDREA STEIN is professor of computer and cognitive science at the Olin College of Engineering. From 1990 to 2000, Dr. Stein was an assistant and then associate professor in the Electrical Engineering and Computer Science Department at MIT and at the Artificial Intelligence Laboratory and Laboratory for Computer Science there. Dr. Stein's research spans the fields of artificial intelligence, programming languages, and engineering and computer science education. She is a co-author of the foundational documents of the semantic web and the "mother" of a humanoid robot and an intelligent room. She is a frequent speaker at educational conferences on work including pioneering curricular applications of inexpensive robotics and a curriculum for introductory computer science. Dr. Stein has received the National Science Foundation Young Investigator Award, a Bunting Fellowship, and several educational awards; she has also served on the Executive Council of the Association for Advancement of Artificial Intelligence, on the Member Services Board of the Association for Computing Machinery and in various leadership positions as a woman in computing. Over the past two and a half decades, Dr. Stein has worked with the worldwide community to develop broader visions of computing and engineering education, running educational workshops, leading professional initiatives, and serving on advisory and visiting committees to a wide range of academic institutions and curricular programs. As a member of Olin College's founding faculty, Dr. Stein played a leadership role in many aspects of the development of the college. In 2009, Dr. Stein was named the founding director of Olin's Initiative for Innovation in Engineering Education. Dr. Stein has a bachelor's degree, cum laude, in computer science from Harvard and Radcliffe Colleges and master's and doctorate degrees in computer science from Brown University.

Monique Umphrey

Member

MONIQUE UMPHREY is the president of Houston Community College Northeast. Prior to joining Houston Community College, Dr. Umphrey was the vice president of Workforce Innovation and the College-wide Dean of Information Technology Center of Excellence at Cuyahoga Community College. In 2014, she immediately started implementing ways to improve the College's computer networking and programming educational tracks and planned for expansions into areas including cybersecurity, data analytics, cloud computing, and the Internet of Things. A new degree in Cybersecurity as well as new certificates in data analytics were launched. Her goal was to unite and leverage the strengths of existing academic offerings and workforce development training to optimize career and educational opportunities for Tri-C students. Dr. Umphrey was selected into the inaugural class of the Aspen Presidential Fellowship for Community College Excellence, a rigorous, ten-month executive leadership program for aspiring community college presidents led by the Aspen Institute and the Stanford Educational Leadership Initiative. She has 20+ years of IT experience; with 8+ years leading large-scale projects at Fortune 500 companies. She also was an adjunct instructor in Information Systems Management and is certified for both online and classroom teaching. Dr. Umphrey earned a B.B.A. in computer information systems and a M.S. from Middle Tennessee State University, and a doctorate of management from the University of Maryland.