Board on Science Education

Committee

Susan R. Singer

Chair

SUSAN RUNDELL SINGER is an experienced national and institutional leader in higher education, uplifting the value of a liberal arts education. She is St. Olaf College's president and was Vice President for Academic Affairs and Provost at Rollins College. Previously, she led the Division of Undergraduate Education at the National Science Foundation (NSF) and was the Laurence McKinley Gould Professor of Biology at Carleton College, where she directed the Perlman Center for Learning and Teaching. Recruited to NSF, she was charged with implementing holistic, evidence-informed approaches to increase the persistence and success of all undergraduates. She led 14 federal agencies in achieving the undergraduate goals of the first Federal STEM Education 5-year Strategic Plan, including producing one million more STEM graduates by 2018. She pursues a career integrating higher education and science aimed at improving undergraduate education at scale. Her scholarship focuses on partnerships and networks of organizations collaboratively advancing undergraduate STEM education, with an emphasis on diversity, equity, inclusion, and belonging. Equitable and excellent undergraduate education is a signature element of her successes at Carleton, NSF, national organizations, and Rollins, enhanced by a strong track record with partnerships and fundraising. Susan is an American Association for the Advancement of Science (AAAS) Fellow, and recipient of the American Society of Plant Biology teaching award and Botanical Society of America Charles Bessey award. She is a past-chair of AAAS' Education Section. Currently, Susan is an Association of American Universities Senior Scholar, chairs the National Academies of Science, Engineering, and Medicine (NASEM) Board on Science Education, and serves on the Board on Life Sciences and the Roundtable on Systematic Change in Undergraduate STEM Education. She chaired several NASEM studies, including Discipline-based Education Research. Her Ph.D. is in Biology from Rensselaer Polytechnic Institute.

Sue Allen

Member

Sue Allen is a Senior Research Scientist at the Maine Mathematics and Science Alliance, and an independent research and evaluation consultant through Allen & Associates. Sue received an M.Sc. in Astrophysics from the University of Cape Town in 1986, and a Ph.D. in Mathematics and Science Education from the University of California at Berkeley in 1994. She was the Founding Director of Visitor Research & Evaluation at the Exploratorium in San Francisco, where she spent 15 years studying informal science learning. From 2008-2011 she had various roles at the National Science Foundation, including leading the Informal Science Education (subsequently renamed AISL) program, and serving as Acting Director of the Division of Research on Learning (DRL). She currently leads two national projects to engage afterschool providers, particularly those in rural settings, in virtual-coaching professional learning communities by using peer-coaching and video-based reflective activities. She has served on several expert committees to characterize STEM learning in out-of-school settings, including those that resulted in the BOSE publications “Learning Science in Informal Environments: People, Places, and Pursuits,” the associated practitioner volume “Surrounded by Science,” and the NSF “Framework for Evaluating Impacts of Informal Science Education Projects.”

Vicki L. Chandler

Member

Vicki L. Chandler (NAS) is dean of faculty at Minerva Schools at Keck Graduate Institute, a new undergraduate liberal arts college. Prior to joining Minerva she was chief program officer of science, at the Gordon and Betty Moore Foundation. While at the Moore Foundation she and her team launched a number of new programs, including the Howard Hughes Medical Institute- Gordon and Betty Moore Foundation Plant Biology Investigator Program. Dr. Chandler’s research on paramutation, a transfer of gene expression patterns from one generation to another, revealed it was epigenetic and mediated by RNA-directed changes to chromatin. Dr. Chandler has been president of the Genetics Society of America and the American Society of Plant Biologists. She was elected to the National Academy of Sciences in 2002 and was appointment by President Barack Obama to the National Science Board in 2014. Other honors include the Presidential Young Investigator Award, Searle Scholar Award, American Association for the Advancement of Science Fellow, election to the American Philosophical Society and receiving the NIH Director’s Pioneer Award. She has served or currently serves on advisory boards and panels for the National Research Council, National Science Foundation, Department of Energy, National Institutes of Health, Howard Hughes Medical Institute, Paul G Allen Foundation, and SoAR Foundation. Dr. Chandler has chaired numerous conferences and served on the editorial boards of several journals. She studied biochemistry for her undergraduate and doctoral degrees at the University of California, Berkeley, and the University of California, San Francisco, with Dr. Randy Schekman and Dr. Keith Yamamoto, respectively. She then pursued postdoctoral research at Stanford University in maize genetics with Dr. Virginia Walbot and was on the faculty at the University of Oregon and the University of Arizona.

Anne Egger

Member

Anne E. Egger is a professor at Central Washington University with a joint appointment in the departments of Geological Sciences and Science and Mathematics Education. In addition, she serves as the Executive Director of the National Association of Geoscience Teachers. Her work focuses on professional development for college and university faculty to implement evidence-based and inclusive teaching strategies, with two areas of focus: (1) geoscience courses and programs and connections to the workforce, and (2) science courses for future K-12 teachers. She earned her MS and PhD degrees in Geological and Environmental Sciences (with a focus on structural geology and tectonics) from Stanford University and her undergraduate degree in geology from Yale University. For her work in geoscience education, Dr. Egger was elected a Fellow of the Geological Society of America in 2019 and a AAAS Fellow in 2021, and received the 2022 Best Paper award from the Journal of Geoscience Education. She has served on two National Academies consensus committees: the Committee on Science Investigations and Engineering Design Experiences in Grades 6-12, which produced the consensus report “Science and Engineering for Grades 6-12: Investigation and Design at the Center” in 2019, and the Committee on Equitable and Effective Undergraduate STEM Education, whose consensus study report will be published in December 2024.

Kirsten Ellenbogen

Member

Kirsten Ellenbogen is President and CEO of Great Lakes Science Center where her energetic leadership has included the strategic initiative Cleveland Connections that leverages emerging technologies, such as blockchain and industrial internet of things, to educate and empower youth in developing personal and community solutions. She conducts her research at the intersection of informal science education, science communication, and rhetoric, focusing on measuring the community impact of science centers and designing learning experiences to facilitate science talk for families. Her leadership over the last thirty years has advanced informal science education through the Center for Informal Learning and Schools, the Nanoscale Informal Science Education Network, the Museum Learning Collaborative, and as co-principal investigator of the Center for Advancement of Informal Science Education. She serves as co-chair of the National Academies of Sciences, Engineering, and Medicine Standing Committee on Advancing Science Communication Research and Practice, and served on the committee that produced the report Learning Science in Informal Environments: People, Places & Pursuits. She earned a Ph.D. in Science Education from Vanderbilt University and B.A. from the University of Chicago.

Noah Finkelstein

Member

Noah Finkelstein is a Professor and Vice Chair (2021-2022, 2024-2025) in the department of Physics at the University of Colorado Boulder. He received his Ph.D. in Applied Physics from Princeton University and a Bachelor's from Yale where he studied mathematics. He conducts research is in physics education, specifically studying the conditions that support students' identities, engagement, and outcomes in physics – developing models of context. In parallel, he conducts research on how educational transformations get taken up, spread, and sustained in higher education. He is a PI in the Physics Education Research (PER) group and was founding co-director of CU's Center for STEM Learning. He co-directs the national Network of STEM Education Centers, is building the STEM DBER-Alliance, and coalitions advancing undergraduate education transformation. He is involved in education policy serving on many national boards, is a Trustee of the Higher Learning Commission, is a Fellow of both the American Physical Society and the American Association for the Advancement of Science, and a Presidential Teaching Scholar and the inaugural Timmerhaus Teaching Ambassador for the University of Colorado system.

Maya M. Garcia

Member

Maya M. Garcia joined the Colorado Department of Education as the Science Content Specialist in 2019, where she leads the implementation efforts for the newly adopted 2020 Colorado Academic Standards for Science and supports CDE's STEM education portfolio. Maya began her career in science education as a middle school science teacher and science department chair, in the District of Columbia, where she taught for over eight years. In 2010, Maya travelled to South Africa as a Fulbright Distinguished Teacher, where she studied how community collaborations could be best leveraged to broaden access to rich and engaging STEM learning experiences in under resourced communities. In 2013, Maya joined the District of Columbia Office of the State Superintendent of Education (OSSE), where she led the District's adoption and implementation efforts around the Next Generation Science Standards (NGSS), Common Core Mathematics, and developed the District's plan for advancing Pre-K- 12 STEM education. Maya also led OSSE's partnership with the Carnegie Academy for Science Education (CASE) to launch the DC STEM Network, a STEM Learning Ecosystem. In addition to her experience in the classroom and state-level work, Maya has also worked at the national level. Maya has served on various national committees and boards, most recently, Maya joined the Board of the Council of State Science Supervisors, and serves as a liaison for the organization's Equity and Access Committee. This organization serves to coordinate and support efforts of the state science supervisors of all states and territories as they work to advance science education. Maya Garcia also served as a member of the NRC Science Education Board Committee on Out of School STEM Learning, and currently serves as a Co-PI on the NSF funded DRK-12 project "The Advancing Coherent and Equitable Systems of Science Education Project." Maya holds a bachelor's degree in Neuroscience and Behavior from Mount Holyoke College and a Master's in Science Teaching from American University, where she served as adjunct faculty in the School of Education.

Archie Holmes

Member

Archie L. Holmes, Jr. currently serves as Executive Vice Chancellor for Academic Affairs at the University of Texas System and is also a Professor of Electrical and Computer Engineering in the Chandra Family Department of Electrical and Computer Engineering at the University of Texas at Austin. He received his B.S. (highest honors) from the University of Texas at Austin and his M.S. and Ph.D. degrees from the University of California at Santa Barbara. Prior to joining the University of Texas System in 2020, Archie was a Professor in the Charles Brown Department of Electrical and Computer Engineering at the University of Virginia and served as the Vice Provost for Academic Affairs.

During his career, Arche has had an active research program focused on the development of novel optoelectronics devices and discipline-based education research where he investigated instructional interventions which assist students in their transition from novice to expert problem solvers. Archie has co-authored over 120 referred technical articles and 80 conference presentations and received numerous awards for his teaching, advising, and service activities. He currently serves on the National Academies' Roundtable on Systemic Change in Undergraduate STEM Education and chaired a 2023-2024 consensus study on Equitable and Effective Teaching in Undergraduate STEM Education.

K. Ann Renninger

Member

K. Ann Renninger is the Dorwin P. Cartwright Professor of Social Theory and Social Action, and professor of educational studies at Swarthmore College. Her research interests include: (a) the role of interest in learning and development; (b) the relation between interest and other motivational variables; (c) change in the cognitive and affective functioning of learners; and (d) links between theory, research and practice as these pertain to changed understanding. Her research program focuses on the role of interest in learning and conditions that support the development and deepening of learner interest. Her studies are typically undertaken in collaboration with practitioners, and have been conducted with participants who range in age (preschoolers through teachers involved in professional development), across a variety of contexts both in and out-of-school. She co-edited the American Educational Research Association volume, Interest in Mathematics and Science Learning (AERA, 2015), and The Cambridge Handbook of Motivation and Learning (2019). She also is co-author of The Power of Interest for Motivation and Engagement (Routledge, 2016). She holds a B.A. from the University of Pennsylvania and a Ph.D. (Human Development) from Bryn Mawr College.

Autumn Rivera

Member

Autumn Rivera is a sixth-grade science teacher at Glenwood Springs Middle School in the Roaring Fork School District in Colorado. She holds a B.A. (‘04) and MAT (‘05) from Colorado College and an M.A. (‘15) from the University of Colorado, Colorado Springs. She is currently working on her Ed.D. at Walden University. Rivera is also an adjunct professor at Colorado Mountain College in the Education Department. During her more than twenty years as an educator, she has worked with students from elementary to postgraduate. Rivera empowers her students and strives to provide them with common background experiences. She was named the 2022 Colorado Teacher of the Year and a Finalist for National Teacher of the Year. She is a 2022 PAEMST State Finalist and the 2023 Association of Middle Level Education Educator of the Year.

Francisco Rodriguez

Member

Francisco C. Rodriguez, since 2014, Dr. Rodriguez has served as Chancellor of the Los Angeles Community College District (LACCD), the largest community college district in the nation with nine accredited colleges, and over 200,000 student enrollments. As CEO, he is responsible for strategic and long-range academic planning, fiscal stewardship, facilities and capital outlay planning and construction, and enrollment management. Under his leadership, Dr. Rodriguez has increased revenues to the District, hired over 800 full-time, tenure-track faculty, bolstered faculty and staff racial and gender diversity, and expanded community and business engagement and philanthropy.

Dr. Rodriguez has 30-plus years of experience as a faculty member and administrator within California public higher education, and speaks and writes on a variety of higher education topics, including transformational leadership, racial equity and social justice, educational opportunity, transfer, student success, foundations and philanthropy, governance, equity and inclusion, cultural diversity, STEM education and workforce development. Dr. Rodriguez is engaged with local, statewide and national committees and is a founding member of the National Academies of Sciences, Engineering, and Medicine Action Collaborative on Preventing Sexual Harassment in Higher Education, and served as a committee member of the Call to Action on Science Education Policy for K-16. He also serves on the National Science Foundation STEM Advisory Panel and served on National Science Foundation Advisory Committee for the Directorate of Education and Human Resources (EHR), 2012 – 2019, and was its chair from 2016 – 2019.

Born and raised in San Francisco, Dr. Rodriguez graduated from the University of California, Davis, with a bachelor's degree in Chicano studies and his master's degree in community development. He received his Ph.D. in Education from Oregon State University and an honorary doctorate in Humane Letters from Loyola Marymount University.

Marcy H. Towns

Member

Marcy H. Towns is Bodner-Honig Professor of Chemistry and director of general chemistry at Purdue University. She is a fellow of the American Association for the Advancement of Science, a fellow of the American Chemical Society, and a fellow of the Royal Society of Chemistry. Her research has focused on undergraduate chemistry laboratory skills including the development and implementation of digital badging to assess hands-on skills, argumentation practices, visualization, and student understanding of the chemistry of climate science. Trained as a physical chemist, her interest in student understanding of mathematics in chemistry has led her to carry out research on student understanding of kinetics and thermodynamics. She developed a passion for research at the interface between mathematics and chemistry that continues to inspire her research. She has received awards for outstanding research and teaching from the American Chemistry Society in addition to numerous teaching awards from Purdue University. Dr. Towns began her career as a high school math and chemistry teacher after graduating from Linfield College with a B.A. in chemistry and mathematics. She holds an M.S. in chemistry and Ph. D. in physical chemistry from Purdue University.

Darryl N. Williams

Member

Darryl N. Williams is the Franklin Institute’s Senior Vice President of Science and Education, oversees core aspects of the mission at the heart of the Institute’s efforts to inspire a passion for learning about science and technology. Dr. Williams joined the Institute from Tufts University’s School of Engineering where he was Dean of Undergraduate Education, Director of Tufts Center for STEM Diversity, and driver of the transformation of the undergraduate curriculum. Prior to Tufts, Dr. Williams spent four years with the National Science Foundation as a rotating program director and managed a range of federal programs and research focused on STEM teaching and learning, designing formal and informal learning environments, and workforce development. He earned his B.S. in Chemical Engineering from Hampton University and his M.S. and Ph.D. in Chemical Engineering from the University of Maryland, College Park.

Heidi Schweingruber

Director

Heidi Schweingruber is the director of the Board on Science Education at the National Academies of Science, Engineering, and Medicine. She has served as study director or co-study director for a wide range of studies, including those on revising national standards for K-12 science education, learning and teaching science in grades K-8, and mathematics learning in early childhood. She also coauthored two award-winning books for practitioners that translate findings of Academies' reports for a broader audience, on using research in K-8 science classrooms and on information science education. Prior to joining the Academies, she worked as a senior research associate at the Institute of Education Sciences in the U.S. Department of Education. She also previously served on the faculty of Rice University and as the director of research for the Rice University School Mathematics Project, an outreach program in K-12 mathematics education. She has a Ph.D. in psychology (developmental) and anthropology and a certificate in culture and cognition, both from the University of Michigan.