20th Anniversary of the Board on Science Education

Charting a Course for the Future

National Academy of Sciences · September 19, 2024

Participant Biographies

BRUCE ALBERTS, Ph.D., a prominent biochemist with a strong commitment to the improvement of science education, was awarded the National Medal of Science by President Barack Obama in 2014. Dr. Alberts served as Editor-in-Chief of Science (2008-2013) and as one of President Obama's first three Science Envoys, assigned to Indonesia (2009-2011). He returned to the Department of Biochemistry and Biophysics at the University of California, San Francisco in 2005, assuming the Chancellor's Leadership Chair for Science and Education after serving for 12 years as the president of the National Academy of Sciences (NAS). During his tenure at the NAS, Alberts was instrumental in developing the landmark National Science Education standards. The type of "science as inquiry" teaching we need, says Alberts, emphasizes "logical, hands-on problem solving, and it insists on having evidence for claims that can be confirmed by others. It requires work in cooperative groups, where those with different types of talents can discover them – developing self confidence and an ability to communicate effectively with others." Alberts is also noted as one of the original authors of The Molecular Biology of the Cell, a preeminent textbook in the field now in its seventh edition. For the period 2000 to 2009, he served as the co-chair of the InterAcademy Council, an organization in Amsterdam governed by the presidents of 15 national academies of sciences; established to provide scientific advice to the world, it is now known as the InterAcademy Partnership for Policy and relocated to Trieste. Committed in his international work to the promotion of the "creativity, openness and tolerance that are

inherent to science," Alberts believes that "scientists all around the world must band together to help create more rational, scientifically-based societies that find dogmatism intolerable." Widely recognized for his research on the molecular mechanism of the protein machines that catalyze DNA replication, Alberts has earned many honors and awards, including 18 honorary degrees.

CARLOTTA M. ARTHUR, Ph.D., is Executive Director of the Division of Behavioral and Social Sciences and Education (DBASSE) at the at the National Academies of Sciences, Engineering, and Medicine. Carlotta brings remarkably broad expertise to DBASSE and the National Academies, including experience in the private sector/industry, philanthropy, and academia, as well as a passion for a wide range of issues at the intersection of people, equity, and STEM. A psychologist and an engineer by training, Carlotta came to the National Academies from the Henry Luce Foundation, where she directed the Clare Boothe Luce Program for Women in STEM and developed the STEM Convergence grant portfolio. Previously, she was at the Andrew W. Mellon Foundation. Carlotta also served as an assistant professor at Meharry Medical College (an HBCU) and as an adjunct assistant professor at the Dartmouth Geisel School of Medicine, and held various engineering roles in the aerospace and automotive industries. Arthur is a member of the Smithsonian National Museum of American History's Lemelson Center for the Study of Invention and Innovation Advisory Board; the Society of Women Engineers Research Advisory Committee; the Jacobs Technion-Cornell Institute Steering Committee; and Trinity Washington University's Board of Trustees. The first African American woman to earn a B.S. in Metallurgical Engineering from Purdue University, Carlotta later earned an M.A. in Psychology, and a Ph.D. in Clinical Psychology (health/psychophysiology emphasis) from the State University of New York at Stony Brook. Arthur was also a recipient of a W.K. Kellogg Scholars in Health Disparities Fellowship (inaugural cohort) at the Harvard School of Public Health.

MEGAN BANG, Ph.D. (Ojibwe and Italian descent), is a Professor of the Learning Sciences at Northwestern University and is the Director of the Center for Native American and Indigenous Research. Dr. Bang studies foundational dynamics of culture, learning, and development across the life course particularly with respect the natural world. She has been especially interested in knowledge organization, reasoning, and decision-making about complex socio-ecological systems and their intersections with identity, cultural variation, history and power. In her work these issues are central to the challenges of the 21st century, such as climate change, adaptation, and sustainability, as well as the kinds of social and civic relations intertwined with these issues. She utilizes this foundational work towards improving STEAM education prek-16 in formal and informal learning environments, educational leadership and policy. A key aspect of her work has been focused on regenerating Indigenous systems of education for the 21st century through community lead projects. She currently has several major projects across multiple states developing inter-disciplinary place based education that focus on science, social-studies, civics, and wellbeing. Dr. Bang is a member of the National Academies of Education, American Academy of Arts & Science, and the Board of Science Education at the National Academy of Sciences.

MELANIE COOPER, Ph.D., is the Lappan-Phillips Professor of Science Education and Professor of Chemistry at Michigan State University. She earned her B.S., M.S., and Ph.D. in chemistry from the University of Manchester, England. Her research includes the development and assessment of STEM curricula based on theories of learning and evidence about how people learn, the impact on student learning, and how students perceive these transformed curricula. She has worked to cross disciplinary boundaries to develop coherent approaches to STEM teaching and learning by leading a team of DBER researchers to develop a coherent approach to gateway STEM courses in higher education. She is a member of the National Academy of Education, a Fellow of the Royal Society of Chemistry, the American Chemical Society, and the American Association for the Advancement of Science. She was a member of the leadership team for the development of the Next Generation Science Standards (NGSS) and has served on the National Academy of Sciences Board on Science Education (BOSE) and as an author on several consensus reports for the National Academy of Sciences. She has received a number awards for excellence in teaching and for her contributions to research.

KIRSTEN ELLENBOGEN, Ph.D., 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 WEETH FEINSTEIN, Ph.D., is Professor of Curriculum & Instruction and Community & Environmental Sociology at the University of Wisconsin Madison. He completed his A.B. in Biological Sciences at Harvard University and both his M.S. in Biology and his Ph.D. in Science Education at Stanford University. Professor Weeth Feinstein studies how people make sense of science in their personal, social, and political lives — and how educational platform such as schools and museums can help. He is best known for his work on science literacy but also teaches and writes about climate change adaptation, environmental and sustainability education, educational responses to the post-truth era, and racial equity in museums. He is emeritus director of UW-Madison's Holtz Center for Science and Technology Studies and has previously contributed to the work of the National Academies of Sciences, Engineering, and Medicine as a speaker, reviewer, report writer, and consensus committee member.

ADAM GAMORAN, Ph.D., is president of the William T. Grant Foundation, a charitable organization that supports research to improve the lives of young people. Two priorities guide the Foundation's grantmaking: identifying ways to reduce inequality in youth outcomes, and improving the use of research evidence in decisions about policy and practice that affect young people. Previously, he held the John D. MacArthur Chair in Sociology and Educational Policy Studies at the University of Wisconsin-Madison, where he spent three decades engaged in research on educational inequality and school reform. He was a member of Board on Science Education (BOSE) of the National Academies of Science, Engineering, and Medicine from 2006 to 2012, and returned to BOSE as chair from 2014-2020. He chaired the BOSE committees on Highly Successful Schools and Programs in K-12 Education (2010-2011) and on the Evaluation Framework for Successful K-12 STEM Education (2012), and served as review coordinator for several reports. More recently, he chaired the BOSE committee that produced the report, *The Future of Education Research at IES: Advancing an Equity-Oriented Science* (National Academies Press, 2022). His research contributions have been honored by the Association for Public Policy Analysis and Management, the American Educational Research Association, and the Sociology of Education Section of the American Sociological Association. He is an elected member of the National Academy of Education and the American Academy of Arts and Sciences, and was twice appointed by President Barack Obama to serve on the National Board for Education Sciences. He received his Ph.D. in education from the University of Chicago in 1984.

MAYA GARCIA, Ph.D., 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, Ph.D., currently serves as Executive Vice Chancellor for Academic Affairs at the University of Texas System. He received his B.S. (highest honors) from the University of Texas at Austin and his M.S. and PhD. 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 also 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. Over his career, Archie has co-authored over 120 referred technical articles and 80 conference presentations and received numerous awards for his teaching and advising activities.

FENGFENG KE, Ph.D., is a Professor of Educational Psychology and Learning Systems at Florida State University and an IPA program director for National Science Foundation. Her research focuses on the design and investigation of technology-supported, learner-adaptive and enactive learning systems for mathematics, science, and neurodiversity education. She is particularly interested in examining the dynamics governing the relations among learner diversity, the design and implementation of innovative learning systems, individualized or collaborative learning processes, and multi-faceted learning outcomes. She has been on the list of the World's Top 2% Scientists (published by Stanford University) continuously since Year 2020. She earned her Ph.D. in Instructional Systems from Pennsylvania State University in 2006.

ANITA KRISHNAMURTHI, Ph.D., is the President of the Collective for Youth Empowerment in STEM & Society (CYESS), a new initiative of the Afterschool Alliance where she also serves as a Senior Vice President for STEM & Youth Engagement. She is deeply committed to promoting equitable access and engagement with science and supporting young people on this journey. Anita launched CYESS to connect literacy and proficiency in STEM fields with community civic engagement and ensure young people are part of the conversation. Anita has a Ph.D. in Astrophysics from The Ohio State University and moved to a career focused on informal STEM learning, recognizing its intersection with social justice and social mobility. Her prior roles have included serving as the Head of Education and Learning at the Wellcome Trust, a philanthropy based in London; Program Manager at NASA Headquarters; Education Lead at NASA's Goddard Space Flight Centre; and Program Officer at the National Academies.

CHRISTINA KWAUK, Ph.D., is a social scientist and policy analyst with expertise on girls' education, 21st century skills and youth empowerment, and the intersections of gender, education, and climate change. Christina is co-editor of *Curriculum and Learning for Climate Action: Toward an SDG 4.7 Roadmap for Systems Change* and co-author of *What Works in Girls' Education: Evidence for the World's Best Investment*. She has published numerous policy papers, including "The new green learning agenda: Approaches to quality education for climate empowerment." Christina is research director at Unbounded Associates, and co-founder of the Unbounded Alliance. She earned a M.A. in Social Sciences from the University of Chicago and a Ph.D. in Comparative and International Development Education from the University of Minnesota.

CATHRYN MANDUCA, Ph.D., founded the Science Education Resource Center (SERC) at Carleton College in 2001 and served as Director until 2020. SERC supports communities of educators in improving education through peer learning and creation of on-line resources. This work included a strong emphasis on Earth education and its relationship to societal issues. Dr. Manduca's scholarship focused on understanding faculty learning and strategies for improving teaching practice. She has also written about the nature of geoscience expertise and the scope and purpose of geoscience education. Currently her interests include community-scale educational ecosystems and the role of education in creating a sustainable, just communities and society. Dr. Manduca was the Executive Director of the National Association of Geoscience Teachers from 2007 to 2019. She served on the Board on Science Education for the National Academies of Science, Engineering, and Medicine, as well as in the elected leadership for the American Geophysical Union and AAAS Education Section. She is a fellow of the AAAS, the American Geophysical Union, and the Geological Society of America, and past recipient of the American Geophysical Union's award for Excellence in Earth and Space Education. She received her B.A. in Geology from Williams College and Ph.D. in Geology from the California Institute of Technology.

CAMILLIA MATUK, Ph.D., is an Associate Professor in the Educational Communication and Technology program at New York University's Steinhardt School of Culture, Education and Human Development. Her research explores how cross-disciplinary inquiry learning experiences can expand the ways that learners engage with and understand the world, and empower them to address issues that matter to them. Her current projects examine roles for technology, community, storytelling, and the arts, in building learners' critical literacies of research, data, and science. Camillia has a Ph.D. in the Learning Sciences from Northwestern University, a M.Sc. in Biomedical Communications from the University of Toronto, an OCGC in 3D Computer Animation from

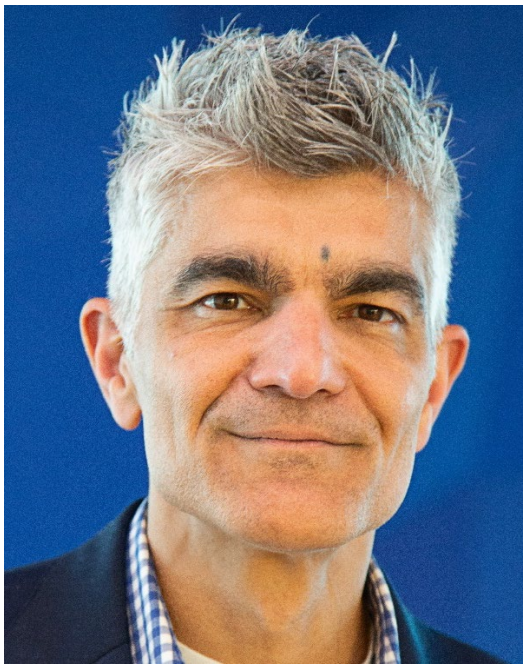
Sheridan College, a B.Sc. in Biological Sciences from the University of Windsor.

MARCIA MCNUTT, Ph.D., is a geophysicist and the 22nd president of the National Academy of Sciences. From 2013 to 2016, she was editor-in-chief of *Science* journals. McNutt was director of the U.S. Geological Survey from 2009 to 2013, during which time USGS responded to a number of major disasters, including the Deepwater Horizon oil spill. For her work to help contain that spill, McNutt was awarded the U.S. Coast Guard's Meritorious Service Medal. She is a fellow of the American Geophysical Union, Geological Society of America, the American Association for the Advancement of Science, and the International Association of Geodesy. McNutt is a member of the National Academy of Engineering, the American Philosophical Society and the American Academy of Arts and Sciences, a Foreign Member of the Royal Society, UK, the Russian Academy of Sciences, and the Chinese Academy of Sciences, and a Foreign Fellow of the Indian National Science Academy. In 1998, McNutt was awarded the AGU's Macelwane Medal for research accomplishments by a young scientist, and she received the Maurice Ewing Medal in 2007 for her contributions to deep-sea exploration. She earned her B.A. in physics, Colorado College and a Ph.D. in Earth sciences, Scripps Institution of Oceanography.

JAMIE MINDEN is a climate activist and the acting Executive Director of *Zero Hour*, a youth climate justice organization. Currently in her senior year at American University, she is pursuing a Bachelor's degree in Environmental Studies and Sociology. Jamie has been organizing for climate justice since the age of 13. Before settling at *Zero Hour*, Jamie co-founded *Sunrise Movement Silicon Valley* and *San Jose Youth Climate Strikes*, organized with *Fridays For Future D.C.* and lobbied congressionally to help pass climate legislation like the Inflation Reduction Act. She has extensive experience hosting seminars on climate and conservation in classrooms from elementary to university levels and has experience working in public facing conservation education as a Teen Conservation Leader at the Monterey Bay Aquarium. Her dual focus on climate activism and STEM education provides her with a unique insight into both advancements and gaps in environmental education today.

C. JEAN MOON, Ph.D., has worked inside and outside of education with appointments at Bowdoin College as a Research Associate as well as Clark University and the University of Maine. At Jackson Laboratory in Bar Harbor, Maine, Moon worked on education and research initiatives in genetics and bio-medical research. Prior to these appointments, she was a Senior Scholar for Education Strategy and Planning at the National Academies. In this role she facilitated idea generation and project development across the Academies and worked to further external relationships with Congress, federal agencies, professional societies, and philanthropic organizations. Ahead of her work as Senior Scholar, Dr. Moon was Director of the Board on Science Education (BOSE). Dr. Moon has been invited to be a Scholar in Residence at the University of Uppsala in Sweden where she worked with the science faculty on the development of competencies and assessment strategies. Currently she is the founder and senior scholar for Tidemark Institute, focusing on the development of online professional development strategies. Dr. Moon received her Ph.D. from the University of Wisconsin – Milwaukee with an emphasis

in learning and development as well as education in urban settings.



RAJUL PANDYA, Ph.D., works at Arizona State University as Fulton Presidential Professor of Practice in Mary Lou Fulton Teachers College and Executive Director of the Global Futures Education Alliance, associated the Julie Ann Wrigley Global Futures Laboratory. Before that he served as the Vice-President of Community Science and founding Director of the Thriving Earth Exchange at the American Geophysical Union. Raj invites everyone—especially people from communities who have been historically excluded —to imagine and build sustainable futures where people and nature thrive together. His work focuses on how science and science education can be more participatory, how community participation contributes to scientific discovery and application, and how the sciences and universities can be allies in advancing community priorities and shared sustainability. Raj served on or is serving on advisory boards for the Anthropocene Alliance, Citizen Science Association (now Association for Advancing the Participatory Sciences), Community and College Partners Program, Cornell Lab of Ornithology, Denver Institute for Science and Policy, ISET International, and Public Lab. He is a member of the Scientific Advisory Council of the American Red Cross, chaired the National Academies committee on "Designing Citizen Science to Support Science Learning," and is a member of the National Academies Standing Committee on Science Communication and the Resilient America Roundtable. He is an editor for the journal *Community Science*. He started his career as an atmospheric scientist, exploring how large thunderstorms grow and persist and taught Meteorology and Astronomy at West Chester University of Pennsylvania.

JAN L. PLASS, Ph.D., Professor and Paulette Goddard Chair in Digital Media and Learning Sciences at New York University, is the founding director of the CREATE Consortium for Research and Evaluation of Advanced Technology in Education and co-director of the Games for Learning Institute. Dr. Plass earned his MA in Mathematics, Physics, and Computer Science Education and his Ph.D. in Educational Technology from Erfurt University (PH Erfurt, Germany). He draws from cognitive science, learning sciences, computer science, and design to envision, design, and study the future of learning with digital technologies, with a current focus on games and XR. He has published widely and is the lead editor of the *Handbook of Game-based Learning* (MIT Press, 2020) and of the forthcoming *Handbook of Learning with Virtual Reality* (MIT Press). Dr. Plass is a frequent national and international keynote speaker and advisor, helping governments and businesses to increase the human capacity in an ecology of lifelong learning.

STEPHEN PRUITT, Ph.D., started his education career as a high school chemistry teacher in Fayetteville and Tyrone, Georgia. During his career, Dr. Pruitt has amassed an extensive policy, assessment and instructional background in education at the local, state and national levels. In May 2018, the Southern Regional Education Board unanimously voted to hire Dr. Pruitt as President. Prior to this appointment, Dr. Pruitt served as Kentucky's sixth commissioner of education, senior vice president for Achieve, Inc., and president of the Council of State Science Supervisors. A native of Georgia, Dr. Pruitt holds a bachelor's degree in chemistry from North Georgia College and State University, a master's degree in science education from the University of West Georgia and a Doctor of Philosophy in chemistry education from Auburn University. Dr. Pruitt and his wife are proud parents of two children.

HELEN QUINN, Ph.D., is Professor Emerita of Particle Physics and Astrophysics at SLAC National Accelerator Laboratory, Stanford University. She received her Ph.D. in physics at Stanford in 1967. After a postdoc at Deutches Electronen Synchrotron (DESY) in Hamburg, Germany and some years doing research and teaching at Harvard University, she worked at SLAC from 1977 until her retirement in 2010. She has received multiple national and international awards for her research in theoretical particle physics. She was the elected President of the American Physical Society in 2004. She has been active in science education for some years, and since her retirement this has been her major activity. She served as a member of the US National Academy of Sciences Board on Science Education (BOSE) from 2005-2009 and as its Chair from 2009-2014. She chaired the BOSE study committee that developed "A Framework for K-12 Science Education", which is the basis of the Next Generation Science Standards (NGSS) and similar standards now adopted by 48 states and the District of Columbia in the US. This study has influenced science teaching and learning world-wide. She now acts as an advisor to those seeking to implement such standards and to science education researchers studying aspects of that work. From 2015 to 2018 she was a member of the initial *Comision Gestora* (Board of Directors) of the National University for Education (UNAE) in Ecuador.

AUTUMN RIVERA, M.A., is a sixth-grade science teacher at Glenwood Springs Middle School in the Roaring Fork School District in Colorado. She holds a B.A. and M.A.T. from Colorado College and an M.A. from the University of Colorado, Colorado Springs. She is currently working on her Ed.D. at Walden University. She 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.

ASENETTE RUIZ, B.A., is a facilitator and creative engineer working to bridge STEM and justice for herself, others, and collectives. She focuses her work on environmental justice and empowering underserved communities. She is currently a Programs & Strategy associate at trubel&co, a tech-justice non-profit championing youth to use data, design, and technology to tackle complex societal challenges. Prior to joining trubel, Asenette managed multiple projects and programs such as co-leading a community-based environmental health initiative in Mexico, facilitating MIT's MITES programs, and co-founded a chapter of Doctors & Engineers Without Borders. Asenette is a proud first-generation graduate, she received a Bachelor's degree in mechanical engineering from Brown University with a certificate focused on environmental justice.

ASLI SEZEN-BARRIE, Ph.D., is the Stacey Nicholas Endowed Chair of Environmental and Climate Change Education and an Associate Professor at the School of Education, University of California, Irvine. She also serves as the faculty advisor for the Environmental and Climate Change Literacy Projects (ECCLPs), which aim to design and implement innovative, justice-oriented partnerships across the UC-CSU systems. Recently, Dr. Sezen-Barrie was a program director at the National Science Foundation's (NSF) Division of Research on Learning, where she co-led the Discovery Research preK-12 program. In this capacity, she contributed to initiatives in science teacher education and justice-oriented climate change education, and represented her division in interagency and cross-directorate programs, including the Wildland Fire Initiative and Critical Aspects of Sustainability. Dr. Sezen-Barrie is the Chief Editor of the forthcoming Handbook of Climate Change Research for Transdisciplinary Science Education (SpringerNature) and the lead author of Data Stories of Climate Change Impacts: Towards Justice-Oriented Education and Action (Harvard Education Press). She holds a Ph.D. in Science Education from Pennsylvania State University and a master's degree in educational sciences from Bogazici University in Istanbul, Turkey.

SUSAN RUNDELL SINGER, Ph.D., 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. Her work integrates 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, Rollins, and St. Olaf, enhanced by a strong track record with partnerships and fundraising. An American Association for the Advancement of Science (AAAS) Fellow, and Senior Scholar for the Association of American Universities, Susan has received national education awards. She chairs the National Academies of Science, Engineering, and Medicine (NASEM) Board on Science Education. She chaired several NASEM studies, including *Discipline-based Education Research*. Her Ph.D. is in Biology from Rensselaer Polytechnic Institute.

HEIDI SCHWEINGRUBER, Ph.D., is the director of the Board on Science Education at the National Academies of Sciences, Engineering and Medicine (NASEM). In that role, she oversees a portfolio of work that includes K-12 science education, informal science education and higher education. Dr. Schweingruber joined the staff of the board in 2004 starting as a senior program officer. In this role, she directed or co-directed several projects including the study that resulted in the report *A Framework for K-12 Science Education* (2011) which served as the blueprint for the Next Generation Science Standards (NGSS). Most recently, she co-directed the study that produced the 2021 report *Call to Action for Science Education: Building Opportunity for the Future.* Dr. Schweingruber is a nationally recognized leader in leveraging research findings to catalyze improvements in science and STEM education policy and practice. She presents widely on the work of the board. Prior to joining NASEM, Dr. Schweingruber worked as a senior research associate at the Institute of Education Sciences in the U.S. Department of Education. She was also the director of research for the Rice University School Mathematics Project an outreach program in K-12 mathematics education, and taught in the psychology and education departments at Rice University. Dr. Schweingruber is a fellow of the American Educational Research Association and the American Association for the Advancement of Science. She holds a Ph.D. in psychology (developmental) and anthropology, and a certificate in culture and cognition from the University of Michigan.

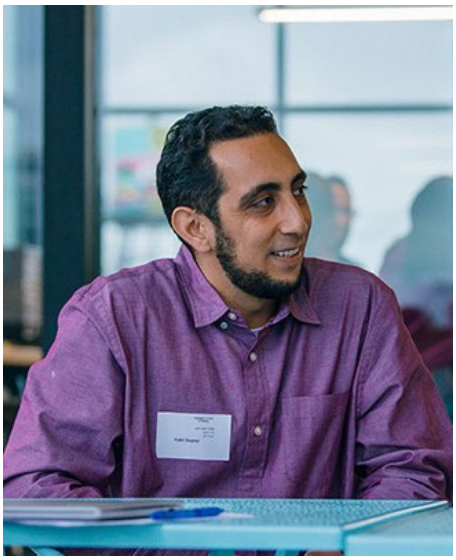
AMY STEPHENS, Ph.D., is the Associate Board Director for the Board on Science Education at the National Academies of Sciences, Engineering, and Medicine. She has served as study director for several consensus studies on a variety of topics to include English learners in science, technology, engineering, and mathematics (STEM) subjects, preschool through elementary science and engineering education, the teacher workforce, and how STEM opportunities can cultivate interest and the development of competencies for computing. She is currently directing the congressionally mandated study on PreK-12 STEM Education Innovations as well as a study on Developing Competencies for the Future of Data and Computing: The Role of K–12. Prior to joining the National Academies, Stephens was a postdoctoral fellow for the Johns Hopkins University's Center for Talented Youth and prior to that worked at the Kennedy Krieger Institute. She received her Ph.D. in psychological and brain sciences from Johns Hopkins University with an emphasis in cognitive neuroscience.

MARTIN STORKDIECK, Ph.D., is the director of Oregon State University's STEM Research Center, and a professor in OSU's College of Education. The Center consists of a team of dedicated professionals of various disciplinary backgrounds who conduct applied research on STEM education and science engagement at the intersection of research, policy and practice, with a strong focus on equity and social justice. The aim is to align understanding of how all people learn throughout the lifespan, in formal and informal settings with evidence-based strategies for STEM engagement and STEM education. Martin has more than 25 years of experience with educational research and evaluation in STEM-related fields and in environmental and sustainability education. Prior to joining OSU, Martin directed the Board on Science Education and the Roundtable on Climate Change Education at the U.S. National Academy of Sciences. Currently, he serves on the Science Advisory Boards for the National Oceanic and Atmospheric Administration (NOAA) and the Leibniz Institute for Science and Mathematics Education in Kiel (Germany). He is also the Chair of

Trustees for TERC, a nonprofit R&D organization in Cambridge, MA and serve as a board member of the Tree Media Foundation in Los Angeles, CA. Previously, he served on the boards of the Citizen Science Association and the Visitor Studies Association. Martin is an elected fellow of the American Association for the Advancement of Science. He holds Master's degrees in biology and public policy and a Ph.D. in education.

ANANYA TADIGADAPA, is in her final year at Northeastern University, majoring in Computer Engineering & Computer Science. She is interested in the energy and sustainability space, previously interning at Tesla, and aspires to utilize software to build a greener future. Her interest in STEM education came from her experience teaching and developing lessons at the Cambridge Math Circle for math enrichment in elementary aged kids, and founding her program EGER, which introduced robotics and engineering to Girl Scouts in Central Pennsylvania. Outside of classes, Ananya is president of the Massachusetts Epsilon chapter of the Tau Beta Pi engineering honor society.

QUENTIN TAYLOR, is a chemical engineering major, mathematics minor at Howard University. At Howard, Quentin is a Karsh STEM Scholar, a member of a prestigious program whose focus is diversifying the research field. His research interests lie in finding better materials for batteries to address energy insecurity, which disproportionately affects black communities. Quentin has done research at many of the country's top facilities including Columbia University and Massachusetts Institute of Technology. On Howard's campus, Quentin is a director of the HU Undergraduate Research Journal which aids in the propagation of research conducted by students of color. In the future, he plans to obtain a Ph.D. and become a professor to create further spaces and opportunities for underrepresented researchers at the highest levels.



SEPEHR VAKIL, Ph.D., is an associate professor of Learning Sciences in the School of Education and Social Policy at Northwestern University, and the faculty director of the Technology, Race, Ethics, and Equity in Education (TREE) Lab. Previously he was Assistant Professor of STEM Education and the Associate Director of Equity & Inclusion in the Center for STEM Education at the University of Texas at Austin. He received his Ph.D. in the Education in Mathematics, Science, and Technology program at UC Berkeley, and his B.S and M.S in Electrical Engineering from UCLA.

NICHOLA WELLS, is an undergraduate honors Physics student at the University of North Carolina at Chapel Hill. Nichola is a passionate advocate for gender equity in STEM and served as an NAE EngineerGirl ambassador. In this role she developed an afterschool program to teach middle school girls how STEM can solve issues in the community through experiments, design challenges, and discussions. Beyond community outreach, Nichola has worked to remove systematic bias from our education system. When her school board passed a policy restricting student research that explored topics such as gender and racial stereotypes, Nichola advocated for students and led a marketing campaign resulting in the overturning of the policy. Nichola's work is focused on promoting STEM education equitably and she can't wait to join the conversation on the future of science education.

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