NATIONAL ACADEMIES Sciences Engineering Medicine

Division of Behavioral and Social Sciences and Education

Board on Science Education

Convocation on the Status of Informal Science and Engineering Education

Presenter Biographies

15 Years After LSIE: Where are we now? Where have we moved the needle?

FLÁVIO AZEVEDO is Associate Professor in the Department of Teaching & Learning, Simmons School of Education and Human Development, and the lead PI of the Learning Everywhere Lab in the same institution. Dr. Azevedo's research sits at the intersection of the nature of STEM interests and interest-driven participation, learning in- and out-of-schools, and society and discourse. Broadly, to speak of people's interest-based participation in practices is to speak about the multitude of ways in which diverse individuals engage any given activity, so that pedagogies for interest development can be powerful pedagogies of inclusion, community building, and social change. Dr. Azevedo's investigates interest-driven participation and learning across timescales and settings of STEM practice (classrooms, after-school programs, hobbies, and museums), as well as the socio-cultural and political contexts of such practices, so as to broaden and deepen participation in STEM and to actively intervene on mechanisms that (re)produce inequities across educational spaces. Dr. Azevedo is a Spencer Foundation fellow, a member of the International Society of the Learning Sciences and the American Educational Research Association, past president of AERA's SIG-Learning Sciences, and a member of the editorial board of the Journal of the Learning Sciences. He holds a B.A. in electrical engineering, a M.S. in computer science, and a Ph.D. in the learning sciences.

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JAMIE BELL is a Senior Advisor for Informal STEM Learning at the Association of Science and Technology Centers (ASTC), where he was the Project Director and Principal Investigator of the Center for Advancement of Informal Science Education (CAISE) from 2010-2023. Prior to that Jamie held a variety of leadership positions in the informal STEM education field, including in youth programming and museum exhibit development at the Exploratorium, teacher professional learning at the Harvard Smithsonian Center for Astrophysics Science Media Group, and as a consultant on science center exhibit development for TERC. Jamie also spent 3 years in Kuala Lumpur, Malaysia developing a Center of Learning at Petrosains: The Discovery Center. He holds degrees from Carnegie Mellon and Harvard Universities and is a 2021 American Association for the Advancement of Science (AAAS) Fellow in education, and a member of the NASEM Standing Committee on Advancing Science Communication. For the past year he has been serving as a Fulbright Specialist in informal STEM learning with the Copernicus Science Center in Warsaw, Poland.

LAURA HUERTA MIGUS has been working at a national level to advance museums' ability to nurture and support a healthy museum workforce and better serve all audiences for more than twenty years. This work was accomplished through leadership appointments at the Institute of Museum and Library Services (IMLS), Association of Children's Museums (ACM), and the Association of Science and Technology Centers, Inc. (ASTC). She is a noted speaker and author on topics of equity and audience-focused museum practice for institutions including the Board of Science Education of the National Academies of Sciences, the U.S. Play Coalition, and various peer-reviewed texts. She has also spearheaded the launch of a number of groundbreaking public-private partnership initiatives, including the National Museum Survey and Museums for All. In 2018, Huerta Migus was named as an Ascend Fellow of the Aspen Institute, and in 2016, she was

recognized as a Champion of Change for Summer Opportunity by the White House. She holds degrees from Texas A&M and Saint Joseph's University.

RON OTTINGER is a nationally recognized leader in STEM education, particularly in the informal and out-of-school-time (OST) space. Over the past two decades, including in his current role as executive director of STEM Next Opportunity Fund, Ron has been instrumental in shaping and expanding the OST STEM field and positioning OST programs as vital to STEM education. Ron previously served as executive director of the Noyce Foundation, where he made significant investments in afterschool and summer STEM learning. After the Noyce Foundation's sunset, Ron helped establish its successor, STEM Next Opportunity Fund, in 2017. Under his continued leadership, STEM Next has achieved remarkable success in strengthening and expanding STEM programming in OST settings. Notably, STEM Next's Million Girls Moonshot initiative was launched in 2020 to engage one million girls in STEM learning opportunities through afterschool and summer programs by 2025. It surpassed its goal within four years, reaching more than 2.6 million girls and 5.2 million young people overall. Ron co-founded the STEM Funders Network and helped launch the STEM Learning Ecosystems Initiative, fostering collaboration among funders, policymakers, and practitioners to create systemic change in STEM education. Prior to STEM Next and the Noyce Foundation, Ron served as national associate director of the nonprofit AVID Center for 14 years and served three terms on the San Diego City Schools' Board of Education, including as its longest-running board president during a period of significant reform.

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SCOTT PATTISON (Moderator) is a Research Scientist at TERC. He is a member of the planning committee.

What are the different goals for science and engineering learning in informal settings and how do we know we're achieving them?

CAREN COOPER is a professor of public science in the College of Natural Resources at North Carolina State University, with her early career including 14 years at the Cornell Lab of Ornithology and four years at the NC Museum of Natural Sciences. She has given keynotes in eight countries and has about 100 publications on topics of avian ecology, human dimensions of conservation, and participatory sciences. She mentors graduate students across a few departments (Fish, Wildlife, & Conservation Biology; Geospatial Analytics; Forestry & Environmental Resources; and Parks, Recreation, & Tourism Management). She is author of Citizen Science: How Ordinary People Are Changing the Face of Discovery and co-author of The Field Guide to Citizen Science: How You Can Contribute to Scientific Research and Make a Difference. She contributes to field-building through her scholarship and supporting practitioners through leading co-creation efforts, such as the Data Ethics Toolkit and the Inclusive, Diverse, Equitable, Accessible, Large-scale (IDEAL) program. She created the Citizen Science Campus program at NC State, including a graduate Certificate in Participatory

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Sciences, a Citizen Science Project Incubator, and annual campus engagement events. Cooper led the committee to create the journal Citizen Science: Theory and Practice and serves as special collections editor (2020+) and associate editor-in-chief (2023+). She was co-chair (2017-2021) of the international CODATA-WDS Task Group on Citizen Science and the Validation, Curation, and Management of Crowdsourced Data and current member of the CODATA-WDS Task Group on Data from Participatory Mapping for the SDGs.

LESLIE GOODYEAR, EDC distinguished scholar and principal evaluation director, is an internationally recognized expert in evaluation and evaluation capacity building. She specializes in evaluating programs that seek to advance equity, and out-of-school and informal STEM education programs. She has deep expertise in culturally responsive evaluation, building communities of practice, qualitative inquiry, and the ethics of evaluation. A past president of the American Evaluation Association, Goodyear leads evaluations for federal, state, and private clients; facilitates evaluation capacity building; and serves as an evaluation adviser for colleagues. Her recent evaluations include Peter Kiewit Foundation Engineering Academy, the Illinois 21st Century Community Learning Center Program, the National Academies Societal Experts Action Network, and an evaluation capacity-building initiative for the National Science Foundation (NSF) AGEP program. From 2009-2011 Goodyear was on leave from EDC to serve as a program officer in the Division of Research on Learning at NSF. While there, she was a commissioner of evaluations across multiple divisions and directorates, led initiatives to build NSF's evaluation capacity, and worked with the AISL, ITEST, and PRIME programs. She has served as the Ethics Section editor and associate editor of the *American Journal of Evaluation* and has been chair of AEA's Ethics Committee. She is co-editor of *Qualitative Inquiry in Evaluation*. Goodyear holds a PhD and an MS in

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Program Evaluation and Planning from Cornell University and a BA in Developmental Psychology from Macalester College.

CHRISTINE REICH is an educator, evaluator, researcher, and nonprofit executive who has worked in the field of informal science learning for over two decades. She is currently an Adjunct Lecturer for Education in the Learning Design, Innovation, and Technology program at the Harvard University Graduate School of Education, President of the Visitor Studies Association, and will begin her tenure as President of TERC this summer. Previously, Dr. Reich served as the CEO of Knology, Ltd. and as the Jane and Payson Swaffield Chief Learning Officer at the Museum of Science, Boston. As a researcher, she has published on a wide range of topics connected to informal science learning, including organizational learning, emotional engagement, and inclusion for people with disabilities. A strong advocate for inclusivity, she was honored as a "Champion of Change" by the Obama White House, and as a fellow by the Noyce Leadership Institute. Christine has a BS in agricultural and biological engineering from Cornell University, a graduate certificate in museum studies from Harvard University, a MEd in museum education from Lesley University, and a PhD in curriculum and instruction from the Lynch School of Education at Boston College.

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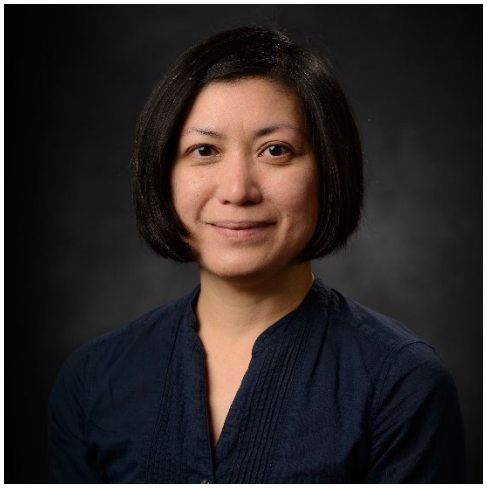

EDNA TAN is Hooks Distinguished Professor of STEM education at the University of North Carolina at Greensboro. Her collaborative research investigates the design and enactment of STEM teaching and learning that seeds rightful presence for minoritized youth across learning contexts and over time. Her research has been published in the American Educational Research Journal, Teachers College Record, the Journal of the Learning Sciences, Journal of Research in Science Teaching, Science Education, among others. In 2020, Dr. Tan was elected as a Fellow of the American Association for the Advancement of Science. In 2023, she was elected as a Fellow of the International Society of the Learning Sciences. She also drinks tea, walks her dog and plays the cello.

CECILIA GARIBAY (Moderator) is President of Garibay Group and is a leading voice in the study and development of equity-focused research and evaluation practices in museum and other informal learning settings. She is a member of the planning committee.

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Invited commentary on the "notable impacts" posters

DIANE MILLER recently retired as the Vice President of Educational Programs at the Detroit Zoological Society (DZS), where she administered all educational and interpretive programming and content. With over two decades of experience in educational leadership, Miller has dedicated her career to advancing STEM education and creating inclusive learning opportunities for diverse communities. Before joining the Detroit Zoo, Miller spent 17 years at the Saint Louis Science Center, ultimately serving as Chief School and Community Partnerships Officer. She was the driving force behind the Youth Exploring Science (YES) program—an innovative initiative designed to engage underserved youth in hands-on science learning. Under her leadership, the program earned the 2005 Association of Science and Technology Centers' Leading Edge Award, a testament to its national impact and innovation. Miller's expertise extends beyond program development; she has collaborated extensively with formal and informal educators, parents, and community organizations to improve student outcomes in STEM disciplines. Her strategic vision and community-first approach have earned her recognition from the Noyce Foundation, which selected her as a Leadership Fellow among executives in science centers and children's museums worldwide. A proud alumna of California State University, Chico, Miller holds a Bachelor of Arts degree and advocates for educational equity and lifelong learning. Through her work at the Detroit Zoo and beyond, she remains committed to inspiring the next generation of scientists, educators, and conservationists.

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RAE OSTMAN is a research professor in the School for the Future of Innovation in Society, co-director of the Center for Innovation in Informal STEM Learning, and a senior global futures scientist at Arizona State University. She is also a leader of the National Informal STEM Education Network (NISE Net), which is currently managed through ASU. She has broad experience in STEM engagement, including planning, developing, implementing, and studying informal learning experiences in partnership with organizations such as science centers and museums. Her current interests include co-creating learning experiences with communities; engaging learners in exploring the relationship of science, technology, and society; and working in immersive formats such as experiential futures and XR games. Prior to joining ASU, she has worked at Acoustiguide (New York, NY), Cornell Botanic Gardens (Ithaca, NY), Exploratorium (San Francisco, CA), Museum of the Moving Image (New York, NY), Royal Ontario Museum (Toronto, ON), Science Museum of Minnesota (Saint Paul, MN), and Sciencenter (Ithaca, NY). She earned a BA in cultural analysis of arts from Cornell University and an MA and PhD in anthropology from New York University.

SUE ALLEN (Moderator) is Co-Director of the Clean Conferencing Institute, a nonprofit dedicated to improving the design of informal learning and networking experiences at virtual professional conferences. She is also Principal of Allen & Associates, an independent research and evaluation consulting firm. She is a member of the planning committee.

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Who is the workforce that supports learning in informal settings and what supports do they need?

MELISSA BALLARD is the Director of Programs at the Association of Science and Technology Centers (ASTC), where she leads a team focused on building the capacity of science centers and museums—and their staff—to equitably engage the public with science. Melissa has previously held roles in advocacy, policy, research, and communications at ASTC, the Center for Advancement of Informal Science Education (CAISE), and the Afterschool Alliance. Prior to that, she worked at a children's science center, developing a variety of STEM programs, training educators, and teaching students. Melissa has a background in industrial and operations engineering and liberal studies, earning a B.S.E. and a B.G.S. from the University of Michigan, Ann Arbor.

PERRIN CHICK began her career as a science teacher and was involved in Audubon's efforts to scale citizen science projects into middle schools. Perrin went on to work as the Education Director of an outdoor education center. During her tenure at the Seacoast Science Center, Perrin worked to scale up family engagement activities across New England. Perrin joined Maine Mathematics and Science Alliance in March of 2016 and currently serves as the PI on ACRES (Afterschool Coaching for Reflective Educators in STEM -NSF Award # 2115229) project. The ACRES project connects out-of-school providers to STEM resources through in-person and virtual professional learning opportunities. ACRES is in a scale-up phase through AISL funding. ACRES is now coaching coaches across the country and has participants in 50 states.

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KATHAYOON KHALIL is the Vice President and Director of the Columbus Center for Wildlife Conservation at the Columbus Zoo and The Wilds. Dr. Khalil has worked on issues of conservation, education, and evaluation in zoos and aquariums for 25 years. Prior to joining the Columbus Zoo, Dr. Khalil served as Associate Vice President of Conservation Learning at the New England Aquarium. Her extensive experience also includes roles such as Conservation Impact Manager at the Oregon Zoo and Director of Engagement at Canopy Strategic Partners. Throughout her career, Dr. Khalil has demonstrated a passion for integrating conservation with diversity, equity, inclusion, and accessibility, creating programs that inspire transformative environmental stewardship. Dr. Khalil's earned her Ph.D. in Education, Learning Sciences, and Technology Design from Stanford University, preceded by a Master of Environmental Science from Yale University. As an adjunct professor through Miami University's Project Dragonfly program, she has facilitated courses in conservation science and biodiversity, engaging students with hands-on experiences in ecosystems across the globe. Dr. Khalil identifies as a conservation psychologist and as such, has worked to bridge research and practice through publications and speaking engagements on topics such as empathy for animals, social learning, and conservation action. She recently worked with a team of educators to create the Core Competencies for Conservation Education which articulates the myriad roles of an educator within a zoo or aquarium context.

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GINA NAVOA SVAROVSKY is the Faculty Director of the Center for Broader Impacts, the Interim Director of the Center for STEM Education, and a Professor of the Practice at the University of Notre Dame. For over two decades, she has been interested in how young people learn science and engineering in both formal and informal learning environments. Specifically, her research explores how youth and families from traditionally underrepresented populations in engineering are able to develop engineering interest, skills, knowledge, and ways of thinking as a result of engaging in authentic engineering activities within a wide range of learning contexts. Dr. Svarovsky also leads and conducts research on the STEM Teaching Fellows program at Notre Dame, which is a 2.5 year fellowship for early-career middle school teachers in the STEM disciplines. Prior to returning to Notre Dame in 2014, Dr. Svarovsky worked as a Senior Evaluation and Research associate at the Science Museum of Minnesota, where she led a number of research and evaluation studies focused on exploring informal STEM learning. She earned her BS in Chemical Engineering from Notre Dame and her PhD in Educational Psychology from the University of Wisconsin.

PREETI GUPTA (Moderator) is the Senior Director for Children, Family and Youth Programs and Research at the American Museum of Natural History. She is a member of the planning committee.

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What are the opportunities and challenges for informal science and engineering learning in an evolving policy landscape?

JAMES BROWN is Executive Director of the STEM Education Coalition. Prior to joining the Coalition, Brown was Director of Advocacy at the American Chemical Society. A nuclear engineer by training, he previously worked as a Legislative Aide for Rep. Doc Hastings of Washington, was Director of Policy and Development at the Consumer Energy Council of America, and began his career as an engineer with Newport News Shipbuilding, working on aircraft carrier construction. He received a B.S. from the University of New Mexico and an M.S. from Penn State, both in nuclear engineering. He also holds an MBA from George Washington University.

MELISSA MORITZ serves as a Senior Advisor for the Alliance for Learning Innovation. As a leader in STEM education and workforce, Moritz also serves as a senior advisor to the STEM Next Opportunity Fund and organizations focused on expanding access to and success in high-quality STEM learning experiences. Moritz previously served as the Deputy Director for STEM at the U.S. Department of Education during the Obama Administration and she served as the inaugural Afterschool and Summer Learning Fellow at the U.S. Department of Education's Institute of Education Sciences. Previously, Moritz served as the Vice President of Strategic Initiatives for the National Math and Science Initiative (NMSI). She also previously served as the Vice President of Science, Technology, Engineering and Math (STEM) and Education Initiatives at Teach For America (TFA. Moritz graduated from MIT with a degree in biology prior to joining Teach for America and serving as a middle-school science teacher in Washington

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Heights, NYC. She resides in DC with her husband and two daughters.

ERIKA SHUGART is Principal of Erika Shugart Consulting a firm that supports non-profit leadership through strategic planning, governance improvement, team building and association management. Prior to her consulting work she was the CEO of two professional associations, the National Science Teaching Association from 2021–2025 and the American Society for Cell Biology from 2016–2021. At both organizations she led strategic planning initiatives that drove organizational success, collaborated with volunteer leadership to revise governance, and built high-performing teams. She was the Director of Communications and Marketing Strategy at the American Society for Microbiology from 2013 - 2016, where she oversaw media relations, digital communications, marketing, the membership magazine and public outreach for the society. Between 2003 and 2013, she oversaw the development of new digital media exhibitions, online experiences and programs as Deputy Director of the Marian Koshland Science Museum of the National Academy of Sciences. In addition to her deep expertise in non-profit leadership, she has been recognized for her expertise in science communication. She received her Ph.D. in biology from the University of Virginia.

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DAVID SITTENFELD is Manager of the Current Science Communication at the Museum of Science, Boston. David has been an educator at the Museum for 20 years, overseeing projects pertaining to issues that lie at the intersection of science and society. He serves as principal investigator for the NOAA-funded Citizen Science, Civics and Resilient Communities project, which is supporting community-based science-to-civics activities at 30 US science centers on extreme heat, drought, extreme precipitation, and sea level rise, and the NSF-funded Building Capacity for Co-Created Public Engagement with Science project. David has led the Wicked Hot Boston and Wicked Hot Mystic projects which identify heat and air quality related vulnerabilities through community-generated participatory science. He is co-founder of the Expert and Citizen Assessment of Science and Technology Network, which implements participatory deliberations on topics such as synthetic biology, artificial intelligence, and deep space exploration. David is also completing his doctoral research at Northeastern University in the Helmuth Lab, focusing on participatory methods and geospatial modeling techniques for environmental health assessment and public engagement.

ANITA KRISHNAMURTHI (Moderator) is the Senior Vice-President for STEM & Youth Civic Engagement at the Afterschool Alliance where she also serves as the President of the Collective for Youth Empowerment in STEM & Society (CYESS). She is a member of the planning committee.

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Reflections from Sponsors

EMMA BANAY, Portfolio Manager, leads Overdeck Family Foundation's Inspired Minds portfolio, which seeks to build the next generation of confident, creative problem-solvers by expanding access to engaging and challenging STEM learning experiences. Prior to joining the Foundation, Emma led STEM initiatives at ExpandED Schools, New York City's afterschool intermediary, forging partnerships with school districts, community-based organizations, city agencies, and regional STEM organizations to deliver high-quality STEM programming. Throughout her career, Emma's work has focused on developing and scaling direct service interventions alongside field-building efforts. Previously, she facilitated the NYC STEM Education Network, an affiliate of the national STEM ecosystems movement, and taught science as a classroom teacher. Emma received an M.S. in Education Policy from Johns Hopkins University and a B.A. in History and Science from Harvard University.

What are the new insights about learning science and engineering in informal settings and how to support learning across the lifespan?

AMARIS ALANIS-RIBEIRO has 20 years of experience advancing STEM education in informal learning environments. She currently works with the Hispanic Access Foundation as Director of Forestry and STEM. Amaris previously directed a public nature center in Chicago, serves as an advisor to the REVISE Center, and is a former fellow of the One Sky Institute Research and Practice Collaboratory and ASTC's Leadership Learning Labs (L3). She completed graduate coursework in Science Education at the Illinois Institute of Technology.

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MONICA E. CARDELLA is Director of the School of Universal Computing, Construction, and Engineering Education at Florida International University. She also holds appointments in FIU's STEM Transformation Institute and Department of Mechanical and Materials Engineering and is the Principal Investigator for the NSF-funded UNIDOS Center for HSI Community Coordination. Her research and teaching focus on engineering design, mathematical thinking, and computational thinking across formal and informal settings. She has investigated this through studies of practicing professionals, undergraduate students and educators, middle school students, elementary school teachers and students, and children and families. This work is done in partnership with other universities, elementary schools, community organizations (e.g. Imagination Station of Lafayette, IN), and other organizations (e.g. the National Society of Black Engineers). Dr. Cardella received the NSF CAREER award in 2011, was recognized as a Fellow of the American Society for Engineering Education (ASEE) in 2020 and received the ASEE 2019 President's Award for the Engineering Gift Guide. She co-edited the 2014 volume Engineering in Pre-College Settings: Research, Policy and Practices and served as the Editor of the Journal of Pre-College Engineering Education Research from 2016 -2019. She has a BSc in mathematics from the University of Puget Sound, and an MS and Ph.D. in industrial engineering from the University of Washington. Before FIU, Dr. Cardella was a Professor of Engineering Education and the Director of the INSPIRE Research Institute for Pre-College Engineering at Purdue University. She served as a Program Director at the National Science Foundation from 2019-2021 and was a National Academy of Engineering Postdoctoral Engineering Education Researcher at Stanford University 2006-2007.

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VERONICA GARCIA-LUIS is the Director of Diversity, Equity & Inclusion at the Exploratorium. She has more than 20 years of experience researching and developing equity focused programs and exhibits to increase STEM learning and engagement opportunities for non-dominant communities. She has co-led the Latino Audience Engagement effort at the Exploratorium and has most recently served as PI/Co-PI on several equity focused National Science Foundation grants including: Cambio: A Professional Development Approach for Building Latinx-focused Cultural Competence in Informal Science Education Institutions; Ciencia Pública: Co-creating Public Outdoor Learning Spaces with Latino Communities; EDGE: Exhibit Designs for Girls' Engagement; and GENIAL: Generating Engagement and New Initiatives for All Latinos. Ms. Garcia-Luis has a BA in art history from UCLA and an MA in museum studies from John F. Kennedy University where she investigated how museums can create effective partnerships with Latino families.

KYLIE PEPPLER is a Professor of Informatics and Education at the University of California, Irvine, where she also directs the Creativity Labs and serves as a co-lead of the Connected Learning Lab. With a background in the learning sciences and the arts, her research explores how creative, interest-driven activities—such as making, fashion design, and digital storytelling—support STEM learning across diverse, out-of-school contexts. Her work bridges disciplines to understand how informal learning environments can promote equity, engagement, and innovation in science and engineering education. Dr. Peppler has led multiple large-scale, federally funded research projects, including several supported by the National Science Foundation and the U.S. Department of Education. She was a major contributor to the MacArthur Foundation's Digital Media and Learning Initiative and played a key role in advancing the maker movement within education. Her recent work explores the implications of generative AI for youth learning and creativity, with an

emphasis on broadening participation in STEM fields. A recognized thought leader, Dr. Peppler has authored or edited over a dozen books and numerous peer-reviewed publications, and she has served on national advisory boards related to STEM education, creativity, and innovation. Her scholarship continues to inform educational policy and practice, particularly around designing inclusive, culturally sustaining learning environments. She brings deep expertise in how informal learning settings can inspire scientific and engineering curiosity and develop competencies across the lifespan.

TINA PHILLIPS is a Social Scientist and the Assistant Director of the Center for Engagement in Science and Nature at the Cornell Lab of Ornithology. Her social science research and evaluation both within and outside the Lab center on understanding and documenting the educational, social, and conservation impacts of citizen science globally and examining the influence of nature engagement on human well-being. She is currently spearheading several large-scale, human behavior change initiatives aimed at decreasing anthropogenic causes of bird mortality. She is a leader in the field of citizen science learning and engagement and has written dozens of articles and chapters on this topic. Previously she led DEVISE, an NSF-funded project aimed at building capacity for project design and evaluation of citizen science learning outcomes, and served as an author on the recent National Academies of Science, Engineering, and Medicine study entitled “Learning through Citizen Science: Enhancing Opportunities by Design.” Phillips is a guest editor for the journal, Citizen Science Theory and Practice and is serving as a Board Member for the Society for Conservation Biology’s Social Science Working Group. She holds a B.S. in Biology from Stony Brook University, and a Master’s and PhD in Education from Cornell University. When not working, she enjoys bird watching, hiking, gardening, skiing, and spending time with her husband, two children, and three dogs.

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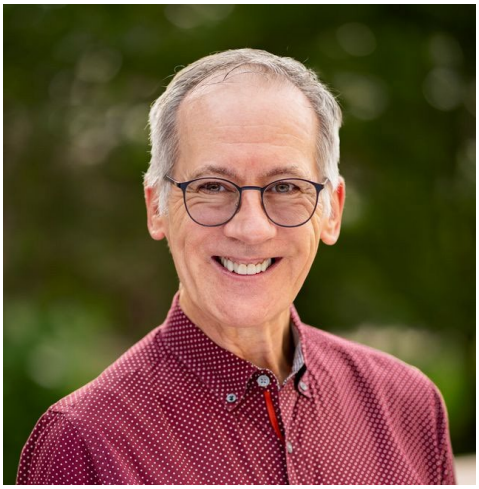

JOE E. HEIMLICH (Moderator) is Lead Research Strategist for COSI, a large science center in Columbus, Ohio, a researcher in COSI's Center for Research and Evaluation. He is a member of the planning committee.

What is the role of ecosystems in advancing informal science and engineering learning?

THOMAS AKIVA is an associate professor of youth development and chair of the department of Health and Human Development at the University of Pittsburgh School of Education. His research centers on fostering community change through the creation of equitable ecosystems for learning and development, and on strengthening youth development program practices, with a particular focus on supporting adult practitioners. Dr. Akiva employs mixed methods and participatory approaches, often working within research-practice partnerships to bridge scholarship and real-world application. He recently served on the National Academies panel that produced the 2025 report, *The Future of Youth Development: Building Systems and Strengthening Programs*. In 2022, he co-edited *It Takes an Ecosystem: Understanding the People, Places, and Possibilities of Learning and Development Across Settings*. His applied research investigates youth-adult relationships, arts education, continuous improvement, and equity in educational and developmental systems.

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MARIJKE HECHT is Assistant Professor of Environmental Education in the School of Environment and Natural Resources at The Ohio State University. Her research focuses on urban communities where she works collaboratively with educators and youth to understand and develop pathways for people to learn about and care for the natural world we are all a part of. She explores questions of environmental identity, environmental literacy about complex ecological issues, and the structure and function of learning ecosystems. Prior to her work in academia, she taught middle and high school math and science in NYC public schools and spearheaded urban environmental restoration projects in Pittsburgh, PA. These community-based projects include advocating for the Nine Mile Run aquatic ecosystem restoration, one of the largest urban stream improvements in the U.S., and managing the design and construction of the award-winning Frick Environmental Center, a public education hub, welcome facility and park gateway that received LEED Platinum and Living Building Challenge certification and is net-zero water and energy. As Director of Education for the Pittsburgh Parks Conservancy, she led the organization in successfully broadening participation in outdoor parks-based science education in partnership with local K-12 educators. She received her PhD in Learning Sciences and Policy from the School of Education at the University of Pittsburgh and a Master of Science in Botany from the Field Naturalist program at the University of Vermont.

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HEATHER JAMESON brings a background in both formal and informal education, with a career rooted in environmental education and community collaboration. She began her career as an Interpretation and Education Ranger at Glacier National Park, where she developed a strong commitment to place-based learning and public engagement. Since then her path has taken her across diverse regions and roles, from serving in the U.S. Peace Corps as a Coastal Resource Management volunteer to working as the Wildlife Education and Outreach Specialist for Northwest Alaska with the Alaska Department of Fish and Game. In her current role as Strategic Initiatives Lead for the Montana Afterschool Alliance, Heather leads a statewide effort to expand and strengthen STEM (science, technology, engineering, and mathematics) learning beyond the school day. Over the past year, she has launched and led the Montana STEM Ecosystem, an initiative to build a network of organizations, institutions, and individuals working collaboratively to expand STEM learning opportunities. Heather has served on the Executive Board of the Montana Environmental Education Association and in her spare time can be found outside recreating or gardening.

NICHOLE PINKHARD is a distinguished learning scientist and educational technology innovator celebrated for her transformative contributions to digital literacy and youth engagement. She is the Alice Hamilton Professor of Learning Sciences in the School of Education and Social Policy at Northwestern University and the Office of Community Education Partnerships faculty director. Dr. Pinkard focuses on creating digital learning environments that ensure equitable access to educational resources for underserved youth. Dr. Pinkard integrates technical expertise with educational theory, advancing the field of learning sciences. She founded the Digital Youth Network (DYN), which empowers young people with digital media skills through integrated learning opportunities, closes the digital divide, and fosters digital proficiency. As the lead learning architect of

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YOUmedia at the Harold Washington Library in Chicago, Dr. Pinkard has redefined library spaces for youth engagement. YOUmedia provides a dynamic environment for teens to explore digital media, collaborate on projects, and develop critical 21st-century skills. Her recent work on "Opportunity Landscaping" maps and optimizes community resources to enhance learning opportunities and aims to make visible the ecosystem of opportunities available in a community to facilitate collaborative approaches to addressing inequities by improving geographic access to educational resources. Dr. Pinkard's contributions have earned her numerous accolades, including an NSF Early CAREER Award, Common Sense Media Award, the Jan Hawkins Award for Early Career Contributions to Humanistic Research and Scholarship in Learning Technologies, and recognition as an AERA Fellow cementing her reputation as a thought leader in using technology to create inclusive and engaging educational environments. She earned a Ph.D. in Computer Science from Northwestern University.

STEVE SNYDER is the president and CEO of the Fleet Science Center and has been with the Fleet since 2013. He held previous positions at The Franklin Institute in Philadelphia and The Kansas City Museum in Kansas City. Dr. Snyder was a 2010 Noyce Leadership Fellow and, as the director of the Science Theater Outreach project, led the group to receive the 1993 AAAS Award for Public Understanding of Science and Technology. He has served on numerous local and national advisory and non-profit boards including the Balboa Park Cutural Partnership, the San Diego Regional Arts and Culture Coalition and the Informal Learning Leadership Collaborative. Dr. Snyder graduated from Carnegie Mellon University and earned his Ph.D. in physics at Michigan State University.

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KEVIN D. CROWLEY (Moderator) is a professor of Education and a Senior Scientist at the Learning Research and Development Center. He is a member of the planning committee.

What are the affordances and challenges of digital media for learning and engaging in science and engineering?

JOE HANSON is a biologist and internationally-recognized science communicator from Austin, TX. He is the creator, host, producer, and head writer of Be Smart, an award-winning YouTube science education show from PBS. He has won numerous awards for his work in web video and science journalism, and is dedicated to developing new and impactful ways that digital storytelling can help people think more deeply about science and the universe they live in.

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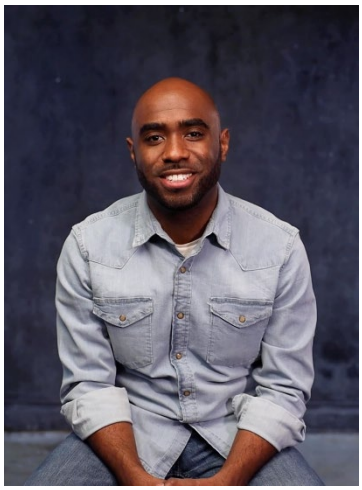
MIZUKO (MIMI) ITO is a cultural anthropologist, learning scientist, and an advocate for connected learning—learning that is joyful, interest-driven, and connected to culture and community. For over thirty years, she has studied digital youth culture and connected learning in Japan and the U.S. She is Professor in Residence and John D. and Catherine T. MacArthur Foundation Chair in Digital Media and Learning at the University of California, Irvine, where she directs the Connected Learning Lab. Mimi is also co-founder of Connected Camps, a non-profit offering social, project-based learning experiences in platforms such as Minecraft and Roblox. She has authored and edited eight books, published by MIT, New York University, and Yale University Press. Recent publications include: *Algorithmic Rights and Protections for Children* (2023), *Social Media and Youth Wellbeing* (2020).



NEHEMIAH MABRY is an Engineer, Educator, and Entrepreneur with a passion for science communication and education. With over 15 years of engineering experience, including work as a NASA Researcher, Bridge Design Engineer, Adjunct Professor, Forensic Engineer, he has built a career at the intersection of technical expertise and engaging storytelling. As the CEO and Founder of STEMedia, an edtech and digital media company, Dr. Mabry creates innovative content that inspires and empowers the STEM community. Since launching STEMedia in 2012, he has collaborated with leading corporations, organizations, and academic institutions, producing award-winning content and impactful STEM outreach initiatives. His work has been featured on WIRED, the Smithsonian Channel, PBS Digital Studios, WGBH NOVA, Discovery, and the History Channel, among others. Dr. Mabry's ability to translate complex STEM concepts into accessible and compelling narratives has made him a sought-after science communicator, dedicated to broadening engagement and representation in STEM.

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REYHANEH MAKTOUFI is an Iranian-American National Geographic Explorer, a published researcher, and science communicator focused on popularizing the science of science communication (SciComm). She is the co-producer, host, and illustrator of PBS| NOVA's digital series Sciencing Out, a mini-series celebrating female science communicators and their unique communication strategies. She is currently an HHMI Fellow, where she designs SciComm training program and strategy. Her latest personal projects are the podcast SciComm Hotline, co-created with her Friend Dr. Stephanie Castillo, and Story Craft: The Stories We Tell and the Science Behind Them, a National Geographic Society-funded project in collaboration with SciComm Lab, aimed at connecting SciComm researchers and practitioners. Through her previous fellowship with Tangled Bank Studios, she has been working extensively with science media and documentary communities. She helps train early career producers and helps them design and run evaluation and impact campaigns that connect science and culture and build trust with audiences. Previously, Rey worked as a Misinformation Civic Science fellow at PBS|NOVA and a visiting researcher at the Adler Planetarium, where she studied curiosity and engagement and trained scientists. Before pursuing her Ph.D. in Media, Technology, and Society at Northwestern University, she worked as a health communication facilitator and cancer preventive/palliative care campaign manager in Tehran, Iran. Rey strongly believes in empowering communities and co-learning with them, leading her to work with communities such as ComSciCon, South Africa-based NEWF, and Jackson Wild. She also engages in SciComm outreach through her comics and illustrations, and pretends to be good at creating social media memes.

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RALPH BOUQUET (Moderator) is the Director of Education and Outreach for NOVA, the PBS science documentary series produced by GBH. He is a member of the planning committee.

Cutting Edge ISEE: What are the innovative approaches to making science and engineering relevant to the learners and challenges of today?

KAREEM EDOUARD is an Assistant Professor of Learning Technologies at Drexel University's School of Education and Co-Director of the ILLEST Lab—the Informal Learning Linking Engineering Science & Technology Lab. His research lives at the intersection of computational making, creative play, and narrative storytelling. Through projects like the Black Male Animation Lab, he supports Black boys in using design and storytelling to explore their identities while building technical and STEM skills. His work centers on culturally sustaining practices and reimagining informal STEM environments as spaces where students are creators, not just consumers. At the heart of his practice is a commitment to equity, creativity, and real-world application. Dr. Edouard also serves as a Creative Producer on the PBS KIDS series Work It Out Wombats!, a show that celebrates problem-solving and community through the lens of diverse characters and stories. A former high school educator, he brings classroom experience into his scholarship and production work. He holds a BA in Media Education from DePaul University, an MA in Teaching from the University of

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Southern California, and a PhD in Learning Sciences and Technology Design from Stanford University. Whether in labs, classrooms, or media studios, Dr. Edouard is committed to making STEAM learning accessible, joyful, and deeply connected to the lived experiences of Black and Brown youth.

NALINI NADKARNI is a Professor of Biology at the University of Utah. Her unique academic career interweaves her scientific research on rainforest canopy biota with innovative public engagement. She has written 150 scientific papers and tree scholarly books on forest canopy-dwelling communities, supported by the National Science Foundation. She also engages with those who do not or cannot gain access to science education, including faith-based groups, artists, corporations, and people who are incarcerated. In 2016, supported by the NSF, she created the "STEM Ambassador Program," which trains academic scientists to design, implement, and evaluate public engagement events in community venues where people work, live, recreate, and worship. Her work is featured in journals ranging from *Science* to *Playboy*, and in public media such as *Science Friday, Wait, Wait, Don't Tell Me,* and *RadioLab*. In 2024, the National Geographic Society named her as one of their ten "Explorers at Large." Her awards include a Guggenheim Fellowship, the AAAS Award for Public Engagement, the National Science Foundation Award for Public Service, The Rachel Carson Award for Conservation, and The Wilson Award for the Advancement of Social Justice.

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DIONNE NICOLE CHAMPION is a learning sciences researcher focused on the design and ethnographic study of learning environments that blend STEM and creative embodied learning activities for children who have experienced feelings of marginalization in STEM education settings. Her diverse background as an engineer, dancer, arts educator, and education researcher gives her an informed perspective on the intersections of arts and sciences, informal and school settings, theory, and practice. Her research focuses on STEM and Arts integration through "making," engaging youth in arts-integrated making practices with an intentional focus on developing equitable relationships, positioning youth and communities as co-researchers. She works primarily with underrepresented populations, researching learning and identity in informal learning spaces, seeking to understand how the body and dance can be resources for sense-making, contribute to the development of agency, and support healthy conversations around race, power, equity, and social issues. Dionne is also the founder of DancExcel, a creative arts center in Gary, Indiana. Her experience running that program include designing and implementing educational programming that infuses science, math, writing and history into music and dance activities. Dionne is currently developing a research program that studies ways to engage children in authentic STEM experiences and that interrogates and complicates the ways we think about sense-making, particularly within informal learning environments like Makerspaces where STEM is not just STEM, movement can be more than "just" movement, and the pathways to understanding are not linear, normative, or even always predictable.

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JYLANA SHEATS is a behavioral scientist, educator, and public health leader who works across sectors to drive behavior change and address complex societal challenges. A systems thinker who values both rigorous science and lived experience, Sheats bridges public health, civic science, and community-rooted practice—drawing on citizen science, community-based participatory research (CBPR), and design thinking—to help communities and institutions reimagine their role in creating equitable health outcomes. Sheats brings her participatory and integrated approach to two leadership roles: as Associate Professor and Course Director for Social Innovation at the Tulane University Celia Scott Weatherhead School of Public Health & Tropical Medicine, where she trains future public health and healthcare leaders; and as Associate Director of the Aspen Institute Science & Society Program, where she advances dialogue on what science is, who it's for, how it's communicated, and why it matters. Her commitment to centering community voices extends beyond her formal roles. She serves in advisory capacities for the Open Research Community Accelerator, the Stanford School of Medicine Research Fellowship Program in Cardiovascular Disease Prevention, and the Climate Mental Health Network. Sheats holds degrees from Spelman College, Tulane University, and Indiana University-Bloomington, and completed a postdoctoral fellowship at Stanford University School of Medicine—grounding her work at the intersection of science, community, and systems change.

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DARRYL WILLIAMS (Moderator) is the Franklin Institute's Senior Vice President of Science, Education, and Human Resources overseeing all aspects of science and educational programming, as well as the capacity building talent management strategy. Williams has previous leadership experience in nonprofit, federal government, and higher education directing a range of programs and research focused on STEM teaching and learning, designing formal and informal STEM learning environments, and STEM workforce development. Williams 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. He is a member on the Board on Science Education at the National Academies of Sciences, Engineering, and Medicine.

Planning Committee

KIRSTEN ELLENBOGEN (Planning Committee Chair) is President and CEO of the Great Lakes Science Center in Cleveland, Ohio. The hallmark of Dr. Kirsten Ellenbogen's energetic leadership is strong community partnerships, such as the collaboration with Cleveland Metropolitan School District that reaches every 6th, 7th, and 8th grade class with programming on everything from circuitry to blockchain. The Science Center has been honored for this work and was named a 2021 National Medal for Museum and Library Service finalist, recognizing their pioneering approaches and commitment to community solutions. Her research and evaluation bring together science communication, rhetoric, and informal science education. 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 served as co-chair of the National Academies of Sciences, Engineering,

and Medicine Standing Committee on Advancing Science Communication, and on the committee that produced the report Learning Science in Informal Environments: People, Places & Pursuits. Most recently, she has been appointed to the Board on Science Education. She has served as a board officer for numerous local and national boards and is currently chair of the Cleveland Water Alliance board of directors.

SUE ALLEN is Co-Director of the Clean Conferencing Institute, a nonprofit dedicated to improving the design of informal learning and networking experiences at virtual professional conferences. She is also Principal of Allen & Associates, an independent research and evaluation consulting firm. Previously Dr. Allen founded the Department of Visitor Research & Evaluation at the Exploratorium, led the Informal Science Education program at NSF, served as Acting Division Director of the Division of Research on Learning, and was a Senior Research Scientist at the Maine Mathematics and Science Alliance. Over her career Dr. Allen has led numerous large federally funded research projects in informal STEM education, mostly in museums or community-based programs. She has also been an external evaluator on multiple federally funded projects and has served on several national expert committees to characterize STEM learning in out-of-school settings. She currently serves on the Board on Science Education (BOSE). She received her Ph.D. in Science and Mathematics Education and has a Master's degree in Astrophysics. She served on the BOSE Committee that led to the 2009 consensus report *Learning Science in Informal Environments: People, Places, and Pursuits*, as well as the Committee for the related practitioner volume, *Surrounded by Science*.

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RALPH BOUQUET is the Director of Education and Outreach for NOVA, the PBS science documentary series produced by GBH. At NOVA, Ralph and his team support science educators by creating free classroom resources and engaging new audiences for NOVA's broadcast and digital productions through science communication events across the country. In his role, Ralph has overseen and contributed to a wide range of NOVA's education projects over the past decade including NOVA's library of over 1,000 free educational resources on PBS LearningMedia, production of science games and interactives on the NOVA Labs platform, and outreach campaigns for NOVA's tentpole projects. He has also participated as a speaker at several science communication and education events including the National Science Teaching Association, the National Math Festival, ComSciCon, SXSWEdu, and more. Before NOVA, Ralph taught high school biology and chemistry in Philadelphia and worked in ed-tech at a Boston-based startup. Ralph received his B.A. from Harvard University and studied secondary science methods and urban education while completing his M.Ed. at the University of Pennsylvania.

KEVIN D. CROWLEY is a professor of Education and a Senior Scientist at the Learning Research and Development Center. Crowley studies informal learning and its connection to learning ecosystems. His work connects research, practice, and community, and recognizes that informal learning invites people to co-construct experiences that reflect their values, needs, strengths, and hopes. Crowley's work has often focused on children's science learning and explored the role of educators and caregivers who know how to facilitate children's learning and development through collaboration, conversation, and brokering new learning opportunities. Working in research/practice partnerships, Crowley employs a range of research methodologies to directly impact practice while simultaneously building generalizable knowledge about informal learning. Recent projects focus on community-based

networks to support climate change education in rural areas, the role of interest and identity in shaping life-long learning pathways, and designing partnerships and networks that can bring museums and community-based organizations together in support of family learning and literacy. Committed to building the field of informal learning, he is co-editor of Visitor Studies and served 15-years as co-lead of the Center for Advancing Informal Science Education. Dr. Crowley has Ph.D. and M.S. in Psychology from Carnegie Mellon University and a B.A. in Psychology and Education from Swarthmore College.

CECILIA GARIBAY is President of Garibay Group and is a leading voice in the study and development of equity-focused research and evaluation practices in museum and other informal learning settings. She specializes in culturally responsive, transformative methodologies and brings a bicultural/bilingual perspective to her work. One area of her research concerns organizational change in museums and other informal learning spaces to support shifts in the systems and practices that can preclude engagement. Bridging the worlds of research and practice, Dr. Garibay's work has included developing frameworks tools for practitioners to support broadening participation. She has led numerous evaluations in the informal learning space and has served as co-PI on various national initiatives in informal STEM learning spaces. She was co-PI for the Center for the Advancement of Informal Science Education (CAISE). Garibay also served National Academies' Board on Science Education Committee which resulted in the seminal publication Learning Science in Informal Environments: People, Places, and Pursuits. She was also a panelist and author for NSF's publication Framework for Evaluating Impacts of Informal Science Education Projects. She is a past board member of the Visitor Studies Association. Dr. Garibay received her Ph.D. in Psychology at Saybrook University.

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PREETI GUPTA is the Senior Director for Children, Family and Youth Programs and Research at the American Museum of Natural History. In this role, she is responsible for strategic planning and program development for out of school time experiences. She leads a research agenda centered on youth learning and serves as faculty for the Masters of Arts in Teaching program for Earth Science teachers. She is also co-editor of the Journal of Museum Education. Prior to this she was serving as Senior Vice President for Education and Family Programs at the New York Hall of Science. In that role, she led the internationally replicated Science Career Ladder Program, key initiatives in teacher professional development, and family programs. She has a Bachelor's Degree in Bioengineering from Columbia University, a Master's Degree in Education from The George Washington University and a doctoral degree in Urban Education from the City University of New York Graduate Center. In 2005, she won the Inaugural National Roy L Schafer Leading Edge Award for Experienced Leadership in the Field from the Association for Science Technology Centers. Her research interests include youth employment and workforce development and the role of cultural institutions in mediating identity development in youth and science teacher preparation. Her notable projects included the the NSF-funded study, Staying in Science, a longitudinal tracking of high school youth to examine persistence with STEM careers, an NSF-funded project focused on studying what and how middle school youth learn computational thinking skills and an IMLS-funded program to prepare college youth to effectively engage visitors in science conversations.

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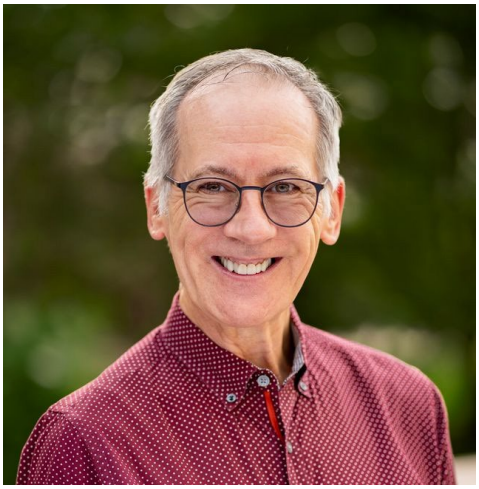

JOE E. HEIMLICH is Lead Research Strategist for COSI, a large science center in Columbus, Ohio, a researcher in COSI's Center for Research and Evaluation. He also serves as an Academy Professor Emeritus with The Ohio State University where he was Extension Specialist in museums and organizational capacity building, Leader, Environmental Science for OSUE, and held appointments in the School of Environment and Natural Resources, the Environmental Science Graduate Program, and the College of Education and Human Ecology. Joe's research focus is lifelong learning about and in the environment, with interests in integration of social role, context, and conditions of the visit. His work is primarily in informal and nonformal lifespan learning. Among other national and international service work, Dr. Heimlich has served as President of NAAEE and the Visitor Studies Association and was on the original Scientific Committee of the World Environmental Education Congress. Some current service includes serving as an advisor on the Global Environmental Education Partnership, participating in the measures and data team on the COVES oversight committee, and as an editor for *Citizen Science: Theory & Practice,* and the *Informal Learning Review*, and an advisor to the Conservation Education Committee of AZA. Joe has worked with international associations such as UNESCO on the steering committee for the Decade on Education for Sustainable Development and IUCN, federal agencies including NOAA, USDA, DOL, and EPA, and was a committee member of the NAS Committee on Designing Citizen Science to Support Science Learning, as well as other NAS workshops and roundtables.

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ANITA KRISHNAMURTHI is the Senior Vice-President for STEM & Youth Civic Engagement at the Afterschool Alliance where she also serves as the President of the Collective for Youth Empowerment in STEM & Society (CYESS). This initiative of the Afterschool Alliance aims to support afterschool programs to more actively engage young people in defining and advocating for solutions to problems that impact their communities, which often require STEM knowledge. Prior to this role, Anita most recently served as the Head of Education and Learning at the Wellcome Trust, a global health philanthropy based in London. Her previous roles include being Vice President for STEM Policy at the Afterschool Alliance, Program Manager at NASA Headquarters, Lead for Education and Public Outreach in the Astrophysics Division at NASA's Goddard Space Flight Centre, and the John Bahcall Public Policy Fellow at the American Astronomical Society. Dr. Krishnamurthi has a Ph.D. in astrophysics and serves on the Boards of the National Girls Collaborative Project and STEM Education Coalition.

RABIAH MAYAS is a Program Director in the Division of Research on Learning in Formal and Informal Environments (DRL) at the National Science Foundation. Previously she held several education leadership roles at the Griffin Museum of Science and Industry, Chicago, most recently as Vice President of Education and Chief Partnerships Officer. Her professional work has focused on building capacity for STEM learning programing and research, with emphasis on public science events, science communication training, maker-based learning, and community engagement. Rabiah has also supported leadership development for informal STEM educators and resource networks for informal STEM learning and engagement, including serving as co-PI of the Center for the Advancement of Informal Science Education (CAISE). She is a member of several nonprofit boards and advisory committees, including the Chicago Children's Museum Advisory Board, the Chicago Learning Exchange Board, and

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the Boys and Girls Club of Chicago Board. She also received an honorary Doctor of Science from Lake Forest College in 2014. Rabiah earned a B.S. in Biochemistry and Molecular Biology and a certificate in Modern Languages and Linguistics from the University of Maryland Baltimore County, where she was also a Meyerhoff Scholar. She also earned a Ph.D. in biochemistry and molecular from the University of Chicago.

SCOTT PATTISON is a Research Scientists at TERC. He has been studying and supporting STEM education and learning since 2003, as an educator, program and exhibit developer, evaluator, and researcher. His current work focuses on engagement, learning, and interest and identity development in free-choice and out-of-school environments, including museums, community-based organizations, and everyday settings. Dr. Pattison specializes in using qualitative and quantitative methods to investigate the processes and mechanisms of learning in naturalistic settings. He has partnered with numerous educational and community organizations across the country to support learning for diverse communities. Pattison earned a Ph.D. in Science Education at Oregon State University in 2014.

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NASEM Staff

TIFFANY E. TAYLOR (Study Director) is a senior program officer for the Board on Science Education at the National Academies of Sciences, Engineering, and Medicine. She is currently the study director for the consensus study on Understanding and Addressing Misinformation about Science, and also provides leadership, management, and support for several ongoing projects including the Standing Committee on Advancing Science Communication, the Expert Meeting Series to Support Effective Federal Health Communications, the Expert Meeting on Implications for Science Education of Increasing AI and Robotics Capabilities, and the Convocation on Informal Science and Engineering Education. She came to the National Academies as a Christine Mirzayan Science and Technology Policy Fellow, where she also worked with the Board on Science Education. She holds a B.S. in biology from Howard University and a Ph.D. in biomedical sciences from the University of California, San Diego.

HEIDI SCHWEINGRUBER is the director of the Board on Science Education at the National Academies of Sciences, Engineering, and Medicine. 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 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 (2012), the blueprint for the Next Generation Science Standards. Dr. Schweingruber is a nationally recognized leader in leveraging research findings to catalyze improvements in science and STEM education policy and practice. 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

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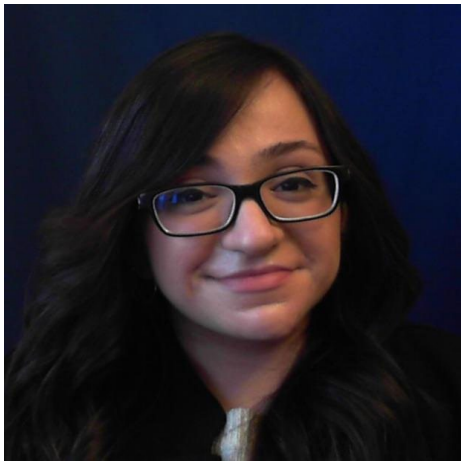
(developmental) and anthropology and a certificate in culture and cognition, both from the University of Michigan.

LAUREN RYAN is a senior program assistant for the Board on Science Education at the National Academies of Sciences, Engineering, and Medicine. She previously worked as a patent examiner at the U.S. Patent and Trademark Office, reviewing applications related to cell culture and biological analysis instruments, and spent three years working in undergraduate admissions at the University of Maine. In her work at the National Academies, Lauren has supported projects related to K-12 science standards, data science, undergraduate STEM education, science communication, and addressing science misinformation. Lauren received her B.S. in biomedical engineering from the University of Maine and is currently pursuing an M.S. in educational psychology with a concentration in educational assessment, evaluation, and data literacy at George Mason University.



LUCY OLIVEROS is a senior program assistant for the Board on Science Education at the National Academies of Sciences, Engineering, and Medicine. She supports the consensus study on Equitable and Effective Teaching in Undergraduate STEM Education; the consensus study producted by the Committee to Assess NASA Science Activation 2.0; and planning committee for the Convocation on the Status of Informal Science and Engineering Education. She earned her bachelors degree in Social Welfare from the University of California, Berkeley.