

Designing Citizen Science to Support Science Learning

Committee

Rajul Pandya

Chair

Dr. Rajul (Raj) Pandya is the director of AGU's Thriving Earth Exchange, which connects scientists, communities, and sponsors and helps them work together to develop solutions that have local impact and global implications. Prior to working with AGU, Dr. Pandya worked as the director of Spark: Education and Outreach and the National Center for Atmospheric Research. Spark built exhibits, developed curriculum, and offered research experiences for students, teachers, and members of the public – all related to climate and weather. Dr. Pandya has managed internships and mentored students, taught in college and high school, collaborated with diverse communities internationally and in the US, and worked on educational technology. He has led multi-disciplinary efforts to increase diversity in the sciences, manage meningitis vaccines more effectively in Africa, and improve student learning of weather and climate. For the National Academies, Dr. Pandya served on the Committee on the Review of the National Oceanic and Atmospheric Administration's Education Program. Dr. Pandya is a founding member of the executive board of the Citizen Science Association, which is currently the only membership organization dedicated to the dissemination of scholarship related to designing and implementing citizen science. He holds a Ph.D. from University of Washington in Atmospheric Science.

Megan Bang

Member

Dr. Megan Bang is an associate professor in educational psychology, learning sciences & human development, education, equity, society studies and a program director of learning sciences and human development. She currently holds multiple faculty positions in the education department at the University of Washington-Seattle. Previously, Dr. Bang was an adjunct professor at Northwestern University. Dr. Bang's research aims to improve educational opportunities for disadvantaged children, families and communities, specifically through STEM education and the education of indigenous peoples. She is involved in three primary strands of work: the study of learning and development in everyday contexts, community-based design research that creates science learning environments based on indigenous systems of knowledge, and the study of child and teacher learning in novel environments. She holds numerous awards from the American Education Research Association, Cognitive Science Graduate Fellow for Interdisciplinary Research Projects, Spencer Foundation Dissertation Fellowship and Outstanding Advising Award from the University of Washington. She earned a Ph.D. in learning sciences and a certificate in cognitive science from Northwestern University.

Darlene Cavalier

Member

Darlene Cavalier is a professor at Arizona State University's Center for Engagement and Training, part of the School for the Future of Innovation in Society. Ms. Cavalier is the founder of SciStarter, an online platform for identifying, supporting, and participating in citizen science opportunities. She is also the founder of Science Cheerleader, an organization of more than 300 current and former professional cheerleaders pursuing STEM careers, and a cofounder of ECAST: Expert and Citizen Assessment of Science and Technology, a network of universities, science centers, and think tanks that produces public deliberations to enhance science policymaking. She is a founding board member of the Citizen Science Association, a senior advisor at Discover Magazine, and a member of the Environmental Protection Agency's National Advisory Council for Environmental Policy and Technology. She is the author of *The Science of Cheerleading* and co-editor of *The Rightful Place of Science: Citizen Science*, published by Arizona State University. Ms. Cavalier holds a master's degree from the University of Pennsylvania in Science History and Policy.

Daniel Edelson

Member

Dr. Daniel Edelson is the executive director of Biological Sciences Curriculum Study (BSCS), a national center for research and development in science education. Dr. Edelson possesses significant experience as a curriculum and educational software developer, educational researcher, and advocate for science and social studies education. Prior to his work at BSCS, Dr. Edelson served as vice president for education at the National Geographic Society and executive director of the National Geographic Education Foundation, as well as a professor at Northwestern University, where he had a joint appointment in education and computer science. As a curriculum and software developer, Dr. Edelson is the lead author of a high school environmental science course, *Investigations in Environmental Science: A Case-Based Approach to the Study of Environmental Systems*, and an author of units in two comprehensive middle school science programs, *Project-Based Inquiry Science* and *Investigating and Questioning our World through Science and Technology (IQWST)*. Dr. Edelson has written extensively on the importance of geoscience, geography, and environmental science education, and has published numerous research papers on motivation, instructional design, educational technology and teacher professional development. Dr. Edelson received a Ph.D. in Computer Science from Northwestern University.

Louis M. Gomez

Member

Dr. Louis Gomez is the MacArthur Chair in Digital Media and Learning at UCLA's Graduate School of Education & Information Studies. Before joining the UCLA faculty he was the Helen S. Faison Professor of Urban Education and sr. scientist at the Learning Research and Development Center (LRDC) at The University of Pittsburgh. Dr. Gomez is also currently serving as a senior fellow at the Carnegie Foundation for the Advancement of Teaching in Palo Alto, Ca. His scholarship focuses on understanding how to support organizational change in schools and other institutions. Dr. Gomez has been dedicated to collaborative research and development with urban communities to bring the current state-of-the-art in instruction and support for community formation to traditionally underserved schools. Most recently, Professor Gomez has turned his attention to problem solving research and development. For the National Academies, Dr. Gomez recently completed service on the Committee on Science Literacy and Public Perception of Science in addition to service on five other committees. He received a B.A. in Psychology from the State University of New York at Stony Brook and a Ph.D. in Cognitive Psychology from the University of California at Berkeley.

Joseph Heimlich

Member

Dr. Joe E. Heimlich is co-director for the Center of Science and Industry's (COSI) Center for Research and Evaluation, and principal researcher the Center's Lifelong Learning Group. His research and evaluation work focuses on projects related to informal learning and capacity building for zoos, nature centers, parks, gardens, science centers, and other museums. He is also an Academy Professor Emeritus with Ohio State University where he was an extension specialist in museums and organizational capacity building and held appointments in the School of Environment and Natural Resources, the Environmental Science Graduate Program, and the College of Education and Human Ecology. Dr. Heimlich received his Ph.D. in educational psychology from the Ohio State University.

Lekelia Jenkins

Member

Dr. Lekelia "Kiki" Jenkins is an assistant professor at Arizona State University in the School for the Future of Innovation. Dr. Jenkins has worked as an environmental consultant for the Natural Resource Defense Council, while also actively participating in the burgeoning field of Studies in Expertise and Experience. Dr. Jenkins was awarded a Ford Foundation Diversity Postdoctoral Fellowship and the David H. Smith Conservation Research Fellowship, which is granted to rising conservation scientists who have the potential to change the face of conservation through entrepreneurial approaches. She became an assistant professor at the School of Marine and Environmental Affairs at the University of Washington and during this time was awarded an Alfred P. Sloan Research Fellowship in Ocean Sciences. Dr. Jenkins has published extensively on adult science learning through decade fisheries learning exchanges (FLEs), in which representatives from different fisher communities collaborate to build capacity and share knowledge. FLEs are regarded as useful for developing and sharing fisheries solutions (which are often conservation technologies) and empowering fisher leaders. Dr. Jenkins received her Ph.D. from Duke University by in marine conservation technology.

Bruce V. Lewenstein

Member

Dr. Bruce V. Lewenstein is Professor of Science Communication and chair of the Department of Science & Technology Studies at Cornell University. He is active in international activities that contribute to education and research on public communication of science and technology, especially in the developing world, and he has published extensively on evaluating citizen science outreach projects. Trained as a historian of science, he works across the field of public communication of science and technology, including informal science education and communication training for scientists. Dr. Lewenstein serves on the board of directors of Embarcadero Media (based in his hometown of Palo Alto, California), which produces community newspapers and related digital media. He is also a faculty-elected member of the Cornell University Board of Trustees. For the Academies, Dr. Lewenstein co-chaired the Committee on Learning Science in Informal Environments, and was a member of the Committee on Communicating Chemistry in Informal Settings, and well as the Roundtable on Public Interfaces of Life Sciences and several other committees. He earned his Ph.D. and M.A. from the University of Pennsylvania in History and Sociology of Science.

Christine Massey

Member

Dr. Christine Massey is a project scientist in the department of psychology at the University of California, Los Angeles. Her major areas of concentration include cognitive development and learning in mathematics and science. She was previously the director of research and education at the Institute for Research in Cognitive Science at the University of Pennsylvania. In this position, she fulfilled the role of associate director for the Institute. She also developed and supported numerous partnerships connecting the cognitive science research community with K-12 and informal education as well as undergraduate and graduate education. She was also the co-founder and director of PENNlincs at the Institute for Research in Cognitive Science, which served as research and development group working to link recent theory and research in cognitive science to education efforts in public schools, cultural institutions, and higher education. She was also a director of Precollege Research and Education at the Institute for Research in Cognitive Science, University of Pennsylvania. For the National Academies, Dr. Massey served as a member of the Committee on Defining Deeper Learning and 21st Century Skills. Dr. Massey earned her M.A. and Ph.D. in psychology from the University of Pennsylvania.

John C. Mather

Member

Dr. John C. Mather (NAS) is a senior astrophysicist and is the senior project scientist for the James Webb Space Telescope at NASA's Goddard Space Flight Center in Greenbelt, MD. His research centers on infrared astronomy and cosmology. As a National Research Council postdoctoral fellow at NASA's Goddard Institute for Space Studies (New York City), he led the proposal efforts for the Cosmic Background Explorer, and came to Goddard Space Flight Center to be the Study Scientist, project scientist, and the principal investigator for the Far IR Absolute Spectrophotometer (FIRAS) on COBE. Dr. Mather is the recipient of numerous awards, including the Nobel Prize in Physics (2006) with George Smoot, for the COBE work, and the NASA Distinguished Service Medal (2007). He is a member of many professional societies including the National Academy of Sciences and the American Academy of Arts and Sciences. Dr. Mather currently serves on the National Academies' Board on Science Education as well as the committee that developed the Framework for K-12 Science Education. He also served in the National Academies' Review Committee for the Koshland Science Museum, as well as the Board on Physics and Astronomy and the Task Group on Gravity Probe B, in addition to a number of other committees and National Academies activities. He received his Ph.D. in physics from the University of California at Berkeley.

Julia K. Parrish

Member

Dr. Julia K. Parrish is the Lowell A. and Frankie L. Wakefield Professor of Ocean Fishery Sciences at the University of Washington, where she also serves as associate dean for Academic Affairs in the College of the Environment. Dr. Parrish also directs the Coastal Observation and Seabird Survey Team (COASST) citizen science project, which uses 800 citizen science data collectors to monitor beach-cast marine birds as one indicator of coastal ecosystem health. Dr. Parrish is a marine biologist, a conservation biologist, and a specialist in animal aggregation. For more than 25 years, Dr. Parrish has conducted field research on seabirds, focusing on the natural and human-caused factors causing population decline. In 1998, Dr. Parrish was honored as a NOAA Year of the Oceans Environmental Hero by Vice President Al Gore for the development of the COASST project, and in 2013, Dr. Parrish was recognized by The White House Office of Science Technology Policy (OSTP) as a Champion of Change for her citizen science work with COASST. In 2015, COASST was cited by the OSTP and the National Science Foundation as an exemplary example of rigorous citizen science. She received her Ph.D. from Duke University in Marine Biology.

Tina Phillips

Member

Tina Phillips is the research and evaluation manager in the Public Engagement in Science Program at the Cornell Lab of Ornithology. She has worked for nearly two decades on developing, managing, and evaluating citizen science projects. Ms. Phillips is the project leader for DEVISE, an NSF-funded project that is building capacity for evaluation and providing common instruments for measuring learning outcomes across the field of citizen science. She is also leading a large-scale NSF-funded research project examining the relationship between engagement in citizen science and outcomes related to knowledge, attitudes, skills, and behavior. Ms. Phillips has developed several science inquiry curricula and frequently writes and speaks on the educational and scientific outcomes of informal science education. Although she works mostly in the realm of citizen science, she is also involved in museum and cyber learning initiatives that seek to understand the processes by which engagement is enhanced and learning supported. Ms. Phillips holds a Master's in Education from Cornell University and is currently pursuing a Ph.D. in Education at Cornell University.

Kenne Dibner

Staff Officer