The National Academies of
SCIENCES · ENGINEERING · MEDICINE
Board on Science Education
Division of Behavioral and Social Sciences and Education

Science and Engineering for Grades 6-12: Investigation and Design at the Center
February 12, 2019

Speaker Bios

JUAN-CARLOS AGUILAR is the director of innovated programs and research at the Georgia Department of Education. He serves as liaison between the department and science organizations, and with the Georgia University System in science. He serves on the board of directors for the Georgia Youth Science and Technology Centers and board of advisors for Valdosta STEAM. He served as the Department of Education science program manager for 9 years, when he oversaw state policy in science education, coordinated K-12 science curriculum development, co-directed Georgia's K-12 STEM initiative, and supervised the alignment of state assessments with the Georgia Performance Standards for science. He led the revision and adoption of the new Georgia Standards of Excellence in Science. He is the past president of the Council of State Science Supervisors. He is an advisor for the NIH SEPA 2015 Emory grant entitled Experiential Citizen Science Training for the Next Generation. He previously taught, including 10 years as a science and mathematics teacher at a Spanish-immersion middle school and 5 years as a high school physics teacher, both in Fayette County, Georgia. He also taught science and mathematics for 4 years at a high school in Guatemala City. He has a Licenciature in Physics from the University Del Valle of Guatemala. He received a principal certification from Morehead State University, M.S. in physics from the University of Louisville, and Ph.D. in physics from the University of Kentucky.

JACLYN AUSTIN is the Instructional Facilitator for Secondary Science for Howard County Public Schools in Maryland where she previously served as the Secondary Science Resource Teacher for Middle Schools. She was also a classroom science teacher and instructional team leader. She serves on the Science Scope Advisory Board for the NSTA and is the past president of the Maryland Association of Science Teachers. She has served as an adjunct faculty instruction for the University of Maryland Baltimore County and a STEM Master teacher for the State of Maryland. She holds a B.S. in Elementary Education and Teaching from Salisbury University and a M.S. in Earth and Space Science, Administration and Supervision from The Johns Hopkins University.

MAYA GARCIA serves as the Director of STEM for the DC Office of the State Superintendent of Education, and was instrumental in the adoption process of the Next Generation Science Standards. She leads implementation efforts around the Next Generation Science Standards (NGSS) in DC, which was one of the first jurisdictions to adopt these rigorous standards. Maya has been instrumental in the development of the District's STEM Plan, in which she helped to identify current needs in STEM careers and opportunities and map out a strategic plan for how to best prepare DC students to meet this need. In addition to authoring the DC STEM Plan, Maya went on to lead OSSE's work to partner with the Carnegie Science Foundation to launch and develop the DC STEM Network. The DC STEM Network is a key component in creating sustained cross-sector collaboration to improve STEM education outcomes for District youth. As a highly effective science teacher, Maya brings over 9 years of classroom experience to her current role, and has served nationally on the Committee for Multicultural Equity for National Science Teachers Association, and as the President of the DC Science Teachers Association. She is currently an adjunct professor in the School of Education at American University, in Washington, DC and is the recipient of numerous awards and fellowships, including a Fulbright Distinguished Teaching Award. She has also served as a member of the NRC Board on Science Education committee on Out of School STEM Learning.

SCOTT HEIMLICH is vice president of the Amgen Foundation. He is responsible for the strategic management and direction of the Foundation's science education portfolio, including the development and oversight of key initiatives at the K-12 and higher education levels. He was the principal architect and continues to lead the Amgen Scholars Program, the Foundation's largest initiative providing undergraduates with access to research opportunities at premier educational institutions across the world. Under his leadership, the Amgen Biotech Experience transformed from a local program into a multi-site, international initiative bringing biotechnology to nearly 90,000 secondary students a year. Through the support of these and many other initiatives – including the new LabXchange platform – the Foundation's commitment to science education has grown to nearly $150 million. Prior to joining Amgen in 2005, he served in positions at the University of California, Los Angeles, Los Angeles Pierce College, University of Southern California, and a junior high school in Japan. He holds a bachelor's degree, master's degree, and doctorate in education from the University of California, Los Angeles.

CARLA JOHNSON is a special advisor to the dean of the Purdue Polytechnic Institute on P16 STEM, executive director of Indiana GEAR UP and professor of science education at Purdue University. In addition, she serves as the director of research for the U.S. Army Educational Outreach Program, which operates STEM programs to inspire children and youth to pursue STEM careers. She is also the executive director of Indiana's GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs), which is designed to increase the number of K-12 students prepared for postsecondary education. Johnson has also served there as the College of Education's associate dean for research, engagement and global affairs and the college's lead for strategic partnerships. In these various roles, she has worked collaboratively with others to develop and implement a strategy for coordinating campus-wide P12 STEM initiatives and has provided leadership for developing and implementing all cross-campus and external partnership efforts within and outside of Indiana. Her book, STEM Road Map: A Framework for Integrated STEM Education has served as a guide for both STEM policy and practice in systemic reform. A book focused on policy and advocacy for STEM education for all children that she co-authored with astronaut Buzz Aldrin — *Investing in Our Future: Preparing the Next Generation for the Innovation Age* — will be published in 2020 by Purdue University Press. She is editor of the School Science and Mathematics journal. She received her doctorate from the University of Cincinnati in curriculum and instruction with emphasis in science education and her bachelor's from Eastern Kentucky University.

DIANE JASS KETELHUT is Associate Professor in the Department of Teaching and Learning, Policy and Leadership at the University of Maryland, College Park. Her research interests center on improving student learning and engagement with science through increasing access, particularly in urban contexts, to scientific inquiry experiences and through raising self-efficacy in science. She looks specifically at the use of virtual environments to deliver scientific inquiry curricula and science assessments to students in the classroom and at professional development to help teachers integrate scientific inquiry into their curricula. Most recently, she has been exploring the integration of computational thinking learning into preservice elementary science teacher education. She holds certification in secondary school science, and was a science curriculum specialist and teacher (science and math) for grades 5-12 for 15 years. She has also spent two years basic research in immunology. She was an Assistant Professor of Curriculum, Instruction and Technology in Education at Temple University for 5 years prior to coming to the University of Maryland in 2011. She received a B.S. in Bio-Medical Sciences from Brown University, an M.Ed. in Curriculum and Instruction from the University of Virginia and doctorate in Learning and Teaching from Harvard University.

MATT KREHBIEL joined Achieve, Inc. in October 2015 as Associate Director, Science, and his work there focuses on science instructional materials and supporting implementation of the NGSS. He previously served as the state science supervisor in the Kansas State Department of Education, leading Kansas' participation as a lead state in developing the Next Generation

Science Standards. In this role, he coordinated the work of the Kansas science standards committee. He also coordinated the state-wide effort to use the implementation of these standards as an opportunity to advance science education for all students. Mr. Krehbiel also served on the Board and later as President of the Council of State Science Supervisors, an organization that serves to coordinate and support efforts of the state science supervisors of all states. He is also a member of the Board on Science Education for the National Research Council, and, in that role, was on the committee that wrote the Guide to Implementing the Next Generation Science Standards. Mr. Krehbiel began his career in science education as a high school science teacher in Kansas, where he taught a wide range of high school science courses over ten years. He earned his B.A. in biology and natural sciences and his secondary teacher certification in general science, biology, and physics from Bethel College. He earned his M.S. in curriculum and instruction with a focus in science education from Kansas State University.

KATE MCNEILL is a Professor of Science Education at Boston College. Her research focuses on helping students with diverse backgrounds learn scientific practices, such as explanation and argumentation. Her research has included the development and use of the claim, evidence and reasoning (CER) framework to support students in these practices. In addition, it has focused on the social aspects of science, such as promoting student-to-student interactions where students build on and critique the ideas of their peers. Supporting students in using both the CER framework and engaging in student-to-student interactions, can help create a classroom community that emphasizes key scientific practices. Her research on scientific practices has included a variety of different areas including focusing on supporting both student and teacher learning. In terms of student learning, this work has included the design of curricular scaffolds, activity structures, and teacher instructional strategies to support students in engaging in scientific explanation and argumentation. Furthermore, she has engaged in work developing student assessments for these scientific practices. In terms of teacher learning, she has conducted research around the design of professional development and multimedia educative curriculum materials (MECMs) to support teachers in developing a deeper understanding of these scientific practices as well as reflecting on how to change their own classroom instruction to support these key learning goals. McNeill advises Boston public schools on how to integrate and support science practices. She currently sits on the National Association for Research in Science Teaching board of directors and serves on the editorial board for the journal, *Science Education*. She earned a doctoral and two master's degrees from the University of Michigan, and she completed bachelor's degrees at Brown University.

BRETT MOULDING is the director of the Partnership for Effective Science Teaching and Learning. He was the state of Utah science education specialist and coordinator of curriculum from 1993 to 2004 and then director of curriculum and instruction until 2008. He taught chemistry for 20 years at Roy High School in the Weber District Science and served as the district teacher leader for 8 years. He also served on the board of the Triangle Coalition, the NAEP 2009 Framework Committee, and as president of the Council of State Science Supervisors from 2003–2006. He has received the Governor's Teacher Recognition Award, the Presidential Award for Excellence in Mathematics and Science Teaching, the Award of Excellence from the Governor's Science and Technology Commission, and the NSTA Distinguished Service to Science Education Award. He served on the National Academies of Sciences, Engineering, and Medicine's committee that developed the Framework for K-12 Science Education, as well as on three committees related to education at NASA. He was a member of the Board on Science Education from 2005–2011. He was a lead writers on the Next Generation Science and currently provides professional development for teachers throughout the nation. He graduated from the University of Utah with a bachelor's degree in chemistry with minors in biology, math, and physics. He also has a master's degree in education from Weber State University and an administrative supervisory certificate from Utah State University.

ANN RIVET is an associate professor of science education at Teachers College Columbia University and a Program Director at the National Science Foundation. Her research examines the role of teachers and

innovative curriculum in inquiry-based learning environments, and how students develop rich understandings of science content in urban middle school settings. Dr. Rivet also serves as the Earth Science content-area specialist in the science education program, with specific expertise in students' interpretation and use of models and other representations for developing understandings of the Earth. Her work has been published in several leading journals including the Journal of Research in Science Teaching and she has presented her work at multiple national and international settings, including the American Educational Research Association and the International Conference of the Learning Sciences. She has a bachelor's degree in physics from Brown University, and a doctoral degree in science education from the University of Michigan.

JIM RYAN is the founding Executive Director of OpenSciEd, and is responsible for leading and managing the work of partners, educators, and stakeholders. He will work with partners to develop long-term plans, and ultimately lead the effort through subsequent phases of developing and field-testing K-12 science instructional materials designed for the Framework and the NGSS. Most recently, Ryan was the Chief Learning Officer at Digital Promise and prior to that, was the STEM Executive Director for the San Francisco Unified School District, leading work to develop a coherent vision of the STEM disciplines, including the development of high-quality instructional materials in science, mathematics and computer science. Through the work of building an educator communities, a shared vision of instruction, and the capacity to build upon one another's expertise, San Francisco is leading the nation in adopting bold policies and programs anchored in equitable instruction. Jim has worked in a variety of capacities to improve education for all students and has put in place policies, curricula, and teacher support built on the belief that academic success in the STEM fields should not be predicated upon ethnicity, gender, or socioeconomic status. Prior to his work in San Francisco, Ryan was a high school administrator and teacher for nine years. He worked as team lead for PowerSchool, a former division of Apple Computers, and then served as Vice President of Key Curriculum Press, a publisher of math and science tools and curricula.

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

NANCY SONGER is the dean and distinguished university professor in the School of Education at Drexel University. Prior to this, she was a professor of science education and learning technologies at the University of Michigan for 18 years and the director of the Center for Essential Science. Her areas of expertise include STEM education, urban education, and educational assessment, and her research focuses on the design of education innovations for promoting critical thinking in science, environmental awareness, increased interactivity, and participation in science careers. She is renowned for her research on how to engage and support complex scientific reasoning among students ranging from elementary to high school ages. Her scholarship has received frequent recognition, including a Presidential Faculty Fellowship awarded by President Clinton. Songer is now leading urban STEM initiatives investigating new definitions of public school-university partnerships with several West Philadelphia public schools within the Drexel University School of Education's neighborhood. She served on the National Academies of Sciences, Engineering, and Medicine's Committee on a Framework for Assessment of Science

Proficiency in K-12. Songer earned a bachelor's degree in biological sciences from the University of California, Berkeley, master's degree in developmental biology from Tufts University, and doctorate degree in science education and learning technologies from the University of California Davis.

JIM SHORT joined the Carnegie Corporation of New York in 2016 as the new Program Director for the foundation's Leadership and Teaching to Advance Learning portfolio of grants. An educator with nearly 30 years in the field, Jim's expertise involves curriculum reform, teacher education and professional learning. He came to the Corporation from the American Museum of Natural History in New York City where he was the founding director of the Gottesman Center for Science Teaching and Learning, a role he began in 2007. He led the Museum's efforts to strengthen science education programs at local and national museums, nonprofit organizations, schools and school districts, including the New York City Department of Education. Jim oversaw the design and implementation of the Urban Advantage initiative in New York City, a museum and school partnership program in nearly half the City's middle schools, supporting long-term science investigations and project-based learning by students. In addition, he was on the faculty of the Museum's Master of Arts in Teaching Program, a first-of-its kind urban teacher residency program for developing certified Earth Science teachers for work in struggling secondary schools. Previously, Jim spent 10 years teaching in K-12 schools and eight years supporting the work of teachers. While working in the Denver Public School System, he led the redesign of the K-12 science program, and at the Biological Sciences Curriculum Study (BSCS) in Colorado Springs, he directed a national science curriculum and implementation center. His professional development experience includes working with school systems and science teachers from several urban school districts nationwide. In recent years, Jim's work has focused on helping teachers translate the Next Generation Science Standards (NGSS) into classroom instruction and assessment through professional learning using tools and processes to analyze and adapt high-quality instructional materials to meet the needs of students. In 2018, he helped design a new initiative, OpenSciEd that Carnegie Corporation launched to spur the development of open education resources and instructional materials to support the implementation of the NGSS. OpenSciEd is currently working with state and district science leaders and teachers from ten partner states along with a consortium of curriculum developers and learning scientists to develop and field test a middle school science curriculum designed for the NGSS.

ANDREA TRACY is assistant principal at Lawton High school, in Lawton, Oklahoma. Prior to that, she taught biology, physical science, and AP physics at MacArthur High School, also in Lawton. She has an extensive background in middle school science teaching, curriculum development, and assessment. Previously, she was an adjunct professor at the University of Phoenix-Okinawa, Japan, where she held an appointment in the Masters of Education in Teaching Department, specializing in teaching and professional development. She is a member of the National Science Teachers Association and the Association for Supervision and Curriculum Development. She did the course work for a master's degree in teaching from Hamline University, holds an Oklahoma School Principal certification, and is currently pursuing her doctoral studies in educational leadership and management at Capella University. She earned a bachelor's degree in biology from the University of North Dakota-Grand Forks and a master's degree in education administration from Lamar University.