#### **Board on Science Education**

# Science and Engineering in Preschool through Elementary Grades

The Brilliance of Children and the Strength of Educators

	The National Academics of SCIENCES - ENGINEERING - MEDICINE
(	CONSENSUS STUDY REPORT
Sci	ience and Engineering n Preschool Through Elementary Grades
THE	BRILLIANCE OF CHILDREN AND
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#### **TUESDAY, JUNE 14, 2022**

Purpose	• To engage with different stakeholders around key recommendations from the Science and Engineering in Preschool Through Elementary Grades: The Brilliance of Children and Strengths of Educators report
	<ul> <li>To elevate how different states and districts are considering policy and practice so that science and engineering are prioritized in preschool through elementary grades</li> </ul>
	<ul> <li>To consider ways to build educator (teacher and leader) capacity so that all children in preschool through elementary grades receive equitable science and engineering learning opportunities</li> </ul>
9:00–9:40 PT 12:00–12:40 ET	Welcome and Introduction to the Report Amy Stephens (Study Director), <i>Board on Science Education</i> Betsy Davis (Committee Chair), <i>University of Michigan</i>
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9:45–10:30 PT 12:45–1:30 ET	Moderator: Jeanane Charara (Committee Member), <i>Michigan State SOLID</i> Start Panelists:
	<ul> <li>Celia De La Loza, <i>El Rancho Unified School District</i></li> <li>Deborah Gordon, <i>Palm Springs Unified School District</i></li> </ul>
10:30–10:45 PT 1:30–1:45 ET	Break
10:45-12:00 PT	Panel: Prioritizing Science and Engineering in Preschool through
1:45–3:00 E I	Moderator: Megan Hopkins (Committee Member), University of California, San Diego
	<ul> <li>Christy Krenek, New Mexico Public Education Department</li> <li>Sharon Matsuzaki, Kings Canyon Unified School District</li> </ul>

• Nicole Scola, Massachusetts Department of Elementary and Secondary Education

12:00–1:00 PT 3:00–4:00 ET	Lunch and Informal Discussions
1:15–2:30 PT 4:15–5:30 ET	<ul> <li>Panel: Building Capacity—Preparation of Teachers and Leaders</li> <li>Moderator: Betsy Davis (Committee Chair), University of Michigan Panelists: <ul> <li>Linda Cook, National Science Education Leadership Association (past president)</li> <li>Debi Hanuscin, Western Washington University; Association for Science Teacher Education (past-president)</li> <li>Kristin Gunckel, University of Arizona</li> </ul> </li> </ul>
2:30–2:45 PT 5:30–5:45 ET	Final Thoughts from the Committee Chair Betsy Davis (Committee Chair), <i>University of Michigan</i>
2:45 PT / 5:45 ET	MEETING ADJOURNS

### **Biographies**

**JEANANE CHARARA** is a professional development provider and K–2 science coach with the SOLID Start research project at Michigan State University. She also is currently a peer reviewer on WestEd's NextGenScience Peer Review Panel and is an EQuIP Science Leader. Charara evaluates science curriculum and determines their alignment to the NGSS as well as provides professional development on how to use the EQuIO rubric. Charara also works as a NGSX Elementary Pathway Designer. She was previously an Elementary STEAM Coach for Dearborn Public Schools in Dearborn, Michigan, where she provided professional development to K–5 teachers and helped guide teacher pedagogies to more equitable science teaching practices and NGSS aligned instruction. Charara also coached K–5 teachers by providing them with support in the science classroom and allowing them opportunities to demonstrate effective science may look different at the early elementary level. She has formerly taught as an elementary teacher and was the Distance Learning Coordinator at the Michigan Science Center. Charara has a Bachelor of Science in Elementary Education with a focus in integrated sciences from Wayne State University. She has also received an M.Ed. in education with an emphasis on teaching English as a second or foreign language from Spring Arbor University.

LINDA COOK has been a science educator and educational leader for almost 40 years. She has taught both middle and high school science classes, served as a district level K-12 Director of Science, and has taught both pre-service and in-service teachers as a university adjunct professor. Dr. Cook holds a bachelor of science degree in biology, a masters of arts degree in science teaching and a doctor of philosophy degree in curriculum and instruction with an emphasis in global STEM education. Dr. Cook currently serves as the past president of the National Science Education Leadership Association. She also volunteers as a North Texas Master Naturalist, serves as the president of the Friends of Coppell Nature Park, and volunteers with Project Unity where she facilitates conversations about race, equity, and social justice.

**ELIZABETH A. (BETSY) DAVIS** is a professor at the University of Michigan, School of Education. Her research focuses on beginning and experienced elementary teachers, teachers learning to engage in rigorous and consequential science teaching, and the roles of curriculum materials and practice-based teacher education in promoting teacher learning. She was the chair for the Elementary Teacher Education Program at the University of Michigan for 4 years and helped lead the reshaping and redesign of this practice-based program. Davis received the Presidential Early Career Award for Scientists and Engineers at the White House in 2002 and the Jan Hawkins Early Career Award in 2004. She was a member of the National Research Council consensus study *Committee on Strengthening Science Education through a Teacher Learning Continuum* and the workshop planning committee on *Design, Selection, and Implementation of Instructional Materials for the Next Generation Science Standards (NGSS)*. Davis earned a B.S.E. in engineering and management systems at Princeton University and an M.A. and Ph.D. in education in mathematics, science, and technology from the University of California, Berkeley.

CELIA DE LA LOZA is an Advisory Board Member for the CA Science Project. She was appointed by the CA State Board of Education. She reviews, make recommendations, and approves funding for science specific and researchbased professional development designed and provided by UC universities and other higher education institutions that enhances teachers' science content knowledge and pedagogical practices in grades TK-12. In May 2022, she was selected as an EdReports Science Content Review Team Member. She believes ALL students and teachers should have access to high quality instructional materials. Since May 2020, she served as an NGSS Aligned Science Instructional Resource Developer and Team Lead for the Science Instructional Resource Development Workshop hosted by the Interim and Formative Assessments Office and the California Assessment of Student Performance and Progress-Science Office of the CA Department of Education. The CA NGSS aligned science resources that she has written are published in Tools for Teachers in the Smarter Balanced Assessment System, which houses free resources in ELA, Math, and Science. In October 2019, she was one of five winners in a statewide science teaching contest, "Science: It's Elementary!" hosted by the CA Department of Education. She is a Digital Learning Instructional Coach at Valencia Academy of the Arts, in the El Rancho Unified School District. I model NGSS aligned lessons for 17 teachers and facilitate CA NGSS aligned lessons to 380 students TK-5 including Special Day Classes. She has been a bilingual teacher in Title 1 schools in Los Angeles County for 30 years. She graduated from UCLA with a BA in Sociology and two specializations: Business and Administration and Education. She obtained a Teaching Credential from Cal State Dominguez Hills, and a Masters in Educational Management. As an English Language Learner, beneficiary of Speech Services, and first-generation college graduate, she has an understanding of the impact a strong supportive network and socially sensitive learning environment can have on an individual. She values student inquiry, hands-on problem solving, extensive dialogues, cooperative learning, and culturally relevant

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and equity-driven pedagogy.

**DEBORAH (DEBBIE) GORDON** is an elementary teacher with over 20 years of experience in the Palm Springs Unified School District in Palm Springs, California. She was District Elementary Science TOSA from 2018-2022 and beginning with the 22/23 school year she will be facilitating learning in a STEAM classroom for TK-5th grade students. Currently serving as President-Elect for the California Association of Science Educators (CASE), Ms. Gordon is a passionate advocate for science and engineering in the elementary grades.

**KRISTIN GUNCKEL** is a professor of science education in the Department of Teaching, Learning, and Sociocultural Studies at the University of Arizona. Her research focuses on environmental science literacy, the preparation of elementary teachers to teach science, and queering science education. Prior to obtaining her Ph.D., Dr. Gunckel was a middle school science teacher, an environmental educator, and a geologist. Dr. Gunckel teaches science methods courses in the elementary teacher preparation program and graduate courses in science education.

**DEBORAH L. (DEBI) HANUSCIN** is a professor at Western Washington University in *Science, Math, & Technology Education* and *Elementary Education*. Her work focuses on supporting elementary teachers' learning across different contexts (content courses, methods courses, and field experiences) and career stages (preservice and inservice). Hanuscin is a past President of the Association for Science Teacher Education and a recipient of their early career award for Outstanding Science Teacher Educator. She has served on the Board of Directors of NARST, and was editor of the *Journal of Elementary Science Education*. Hanuscin earned a B.Ed. in elementary education at the Florida State University and after a career as an elementary teacher and informal science educator completed Ph.D. in curriculum and instruction at Indiana University, Bloomington.

**MEGAN HOPKINS** is an associate professor of education studies at the University of California, San Diego (UCSD). Before joining UCSD, she held faculty appointments at the Pennsylvania State University and University of Illinois at Chicago. She is a former bilingual elementary school teacher, and has conducted extensive research examining how schools and school systems organize for equity, with a particular focus on the education of immigrant and multilingual students. In studies funded by the U.S. Department of Education's Office of English Language Acquisition, the Spencer Foundation, and the W.T. Grant Foundation, she has investigated the implementation of language policies and ELD course placement policies, as well as content-specific curricular reforms. She has also engaged in context-embedded teacher professional development focused on fostering science learning opportunities for multilingual learners in the early elementary grades. Her scholarship has appeared in several top-tier journals, including American Educational Research Journal, Educational Researcher, and Journal of Teacher Education, and she is co-editor of the volumes Forbidden Language: English Learners and Restrictive Language Policies and School Integration Matters: Research-Based Strategies to Advance Equity. In 2012, she received the Dissertation of the Year Award from the Bilingual Education Research Special Interest Group of the American Educational Research Association. In 2016, she was selected as a National Academy of Education/Spencer Foundation Postdoctoral Fellow. She served on the National Academies of Sciences, Engineering, and Medicine consensus committee that authored the report English Learners in STEM Subjects: Transforming Classrooms, Schools, and Lives (2018). Hopkins received her Ph.D. in education at the University of California, Los Angeles.

**MARGARET KELLY** is a senior program assistant for the NASEM Board on Science Education. Margaret has more than 20 years of experience working in the administrative field. She has worked for the private sector, federal government and non-profit organizations, including American University, Catholic University, the Census Bureau, International Franchise Association, the Department of Defense and the University of the District of Columbia. Kelly has received numerous professional honors and awards throughout her career, including a Citizenship/Spirit Award; a Teamwork/Collaboration Award; a Superior Performance of Customer Service Award; Sustained Superior Performance Cash Awards; and Air Force Organizational Excellence Awards and Certificates of Appreciations.

**CHRISTY KRENEK** is a New Mexico K–12 Science Specialist, Christy Krenek supports educators around the state with the implementation of NM STEM Ready! Science Standards by collaborating with various professional learning partners, New Mexico's Assessment Bureaus, and Instructional Materials Bureau. Ms. Krenek is a member of the Council of Science State Supervisors and a member of the professional development Ad hoc committee, a member of the Advancing Coherent Equitable Systems of Science Education (ASCESSE) as the New Mexico Lead and a lead with the Interstate Science Collaborative. Ms. Krenek comes to the New Mexico Public Education Department with over twenty-plus years of experience in education as a classroom educator, district instructional coach, and new teacher mentor. During her time in the classroom, Ms. Krenek provided her students with several STEM opportunities by coordinating with informal educators to provide lessons around STEM opportunities in the community and sponsoring several enrichment clubs and competitions. Also during this time, she has served as the

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Co-Chair of the New Mexico's Math and Science Advisory Council guiding the Math and Science Bureau, and New Mexico Education subcommittees with recommendations for STEM education. Ms. Krenek served as the secretary and regional representative of the New Mexico Science Teachers' Association. Ms. Krenek's interests include culturally responsive education and facilitating adult learning. In her free time, she enjoys hiking, reading, and spending time with her family. Christy Krenek has a degree in Elementary Education from Western Illinois University with an emphasis in science and a master's degree in Curriculum and Instruction from New Mexico Highlands University.

**SHARON MATSUZAKI** is an educator with 35 years of experience at various levels within Kings Canyon Unified School District. For the past 17 years, she has been a principal. The first at an elementary school for eight years, and the most recent eight years at the middle school level. As a teacher, Sharon was a leader in the California Science Implementation Network (CSIN) where she received outstanding professional development in science teaching and learning. As an administrator, she has worked closely with the K-12 Alliance and WestEd in the CA NGSS Early Implementation Initiative. It was through this collaboration as a member of the Core Leadership Team Sharon was able to shape the administrative program and influence professional learning for administrators. Designing and providing professional learning for site and district administrators was another major role in the implementation of NGSS. The NGSS Administrator program included sessions such as: NGSS 101; What is Quality NGSS instruction?; Using Science Classroom Observation Tools; Gathering and Using Observational Data to Guide Instruction; 5E Lessons; Equity in Science; Science and Literary and/or Math Connections. At the state level, Sharon advocated for quality science education by modeling how it can be done. Presentations at the Early Implementer Initiative Administrators, and was an administrator panel representative for the 2020 Science Community of Practice session on Prioritizing Science Teaching and Learning in Uncertain Times.

**NICOLE SCOLA**, as the Manager of Science and Technology/Engineering (STE) in the STEM office at the Massachusetts Department of Elementary and Secondary Education (DESE), Nicole leads the team responsible for the development and implementation of the MA STE Curriculum Frameworks PK-12. She supports districts to implement STEM programs that center equity and embody rigorous and culturally relevant curriculum, instruction, and assessment by overseeing the design and dissemination of science resources, instructional materials, and professional development, including leading the OpenSciEd curriculum field test for Massachusetts. She also works across the agency and with organizations to promote coherence in STEM education.

**AMY STEPHENS** is a senior program officer for the Board on Science Education of the National Academies of Sciences, Engineering, and Medicine. She is an adjunct professor for the Southern New Hampshire University Psychology Department, teaching graduate-level online courses in cognitive psychology and statistics. She has an extensive background in behavioral and functional neuroimaging techniques and has examined a variety of different populations spanning childhood through adulthood. She was the study director for the workshop on *Graduate Training in the Social and Behavioral Sciences* and recently released consensus reports *English Learners in STEM Subjects: Transforming Classrooms, Schools, and Lives* (2018), *Changing Expectations for the K–12 Workforce: Policies, Preservice Education, Professional Development, and the Workplace* (2020), and *Cultivating Interest and Competencies in Computing: Authentic Experiences and Design Factors* (2021). She holds a Ph.D. in cognitive neuroscience from The Johns Hopkins University and was a postdoctoral research fellow at the Center for Talented Youth and the university's School of Education.