

Developing Competencies for the Future of Data and Computing: The Role of K-12

Committee

Nicholas J. Horton

Chair

Nicholas Jon Horton is Beitzel Professor of Technology and Society (Statistics and Data Science) at Amherst College. Horton is a biostatistician who has worked to improve quantitative, computational, and data acumen for students from a variety of backgrounds. He is the editor of the Journal of Statistics and Data Science Education and is on the board of directors for the American Statistical Association. He also chaired the Committee of Presidents of Statistical Societies and served as co-PI of the NSF-funded Data Science Corps Wrangle/Analyze/Visualize and Mosaic projects. Horton co-chaired the Planning Committee for the NASEM Workshop on K-12 Data Science and co-chaired the National Academies Committee on Applied and Theoretical Statistics. He has published more than 200 papers and books, is a fellow of the American Statistical Association and the American Association for the Advancement of Science, and has received a number of awards, including the ASA Founders Award and the Waller Education Award. Horton received his ScD in Biostatistics from the Harvard Chan School of Public Health.

Anna E. Bargagliotti

Member

Anna Emilia Bargagliotti is a professor of Mathematics and Data Science and faculty affiliate for the School of Education at Loyola Marymount University. Her areas of expertise include statistics education, nonparametric statistics, generalized linear models, and data visualization. Bargagliotti also has extensive experience working on STEM recruitment and retention, curriculum development, and teacher professional development. She currently serves as the vice-chair for the American Statistical Association (ASA) Education Council and as co-chair for the Statistics of Education of Teachers (SET) II report. She had served as an Associate Editor for the Journal for Statistics and Data Science Education and chair of the ASA/NCTM Joint Committee. Bargagliotti was a co-lead author on the Guidelines for Instruction in Statistics Education II report (GAISE II) and the Statistics Education of Teachers report (SET). She has won several prestigious awards including the Mu Sigma Rho William D. Warde Statistics Education award, the Seaver College Elizabeth and Michael Rudinica Student-Faculty Research award, the ASA Waller Education award, and the MAA Sigma Statistics Education Dex Whittinghill award.

Shaundra B. Daily

Member

Shaundra B Daily is a Cue Family Professor of The Practice in Electrical and Computer Engineering & Computer Science and Levitan Faculty Fellow at Duke University. Previously, she was an associate professor with tenure at the University of Florida and an associate professor and interim co-chair at Clemson University. Her research focuses on designing, implementing, and evaluating technologies, programs, and curricula that support inclusive excellence in STEM learning environments. She currently serves as Backbone Director for the Alliance for Identity-Inclusive Computing Education and is the Education and Workforce Director for the Athena AI Institute. Daily earned her B.S. and M.S. in electrical engineering from the Florida Agricultural and Mechanical University – Florida State University College of Engineering and an S.M. and Ph.D. from the Media Lab at the Massachusetts Institute of Technology.

Laura G. DeMarco

Member

Laura DeMarco is a professor of Mathematics at Harvard University. Her research is focused on algebraic dynamical systems, with an emphasis on notions of stability and bifurcation. Her recent work explores connections between dynamical systems and arithmetic geometry. DeMarco was elected to the National Academy of Sciences in 2020; she was awarded the Alexanderson Prize from the American Institute of Mathematics in 2020 and the Satter Prize from the American Mathematical Society in 2017. She is a Fellow of the American Mathematical Society and serves on the Advisory Board of Quanta Magazine. Prior to her arrival at Harvard in 2020, she was the Henry S. Noyes Professor of Mathematics at Northwestern University and held positions at the University of Illinois at Chicago and at the University of Chicago.

Emily E. Edwards

Member

Emily E Edwards is an Associate Research Professor in the Department of Electrical and Computer Engineering at Duke University and an affiliate of Duke Quantum Center. Previously she was the Executive Director of the Illinois Quantum Information Science and Technology Center. Edwards co-leads the National Q-12 Education Partnership, a consortium that works with teachers to bring quantum science topics into their classrooms and connect students with emerging careers in this field. She is an expert in science communication with a focus on developing and studying multimedia content to increase awareness, interest, and knowledge about quantum information science and physics. Since 2011, she has co-created multiple resources for the public of all ages to learn about this complex, yet critical area research and technology. This includes the online glossary “The Quantum Atlas,” and a quantum computing game world for middle grade students. Edwards is a Fellow of the American Physical Society. Edwards received a PhD from the University of Maryland in the area of ultracold atomic physics and was a postdoctoral researcher in ion trap quantum information science.

Susan Gomez-Zwiep

Member

Susan Gomez Zwiep is currently a Senior Science Educator and the Director of Equitable Impact at BSCS Science Learning. She is also Professor Emeritus at California State University, Long Beach, Science Education. In addition to her work in science professional learning, she also has contributed to research in the area of science content integration; specifically, math and science integration and blending science and English language development. Gomez Zwiep is an advisory board member of STEM Tales and for CSforALL. In 2011, she was awarded the Innovation in Teaching Science Teachers award from the Association of Science Teacher Education and the Early Academic Career Excellence Award from California State University, Long Beach. Gomez Zweip holds a B.S. in Integrative Biology from UC Berkeley, a M.A. in Education from Whittier College and a PhD in Curriculum and Instruction (Science Education) from the University of Southern California. ?

Shuchi Grover

Member

Shuchi Grover is the Senior Research Scientist and Director of AI and Education Research at Looking Glass Ventures. She is a computer scientist and learning scientist by training who has been committed to PK-12 computing education in formal and informal settings for over two decades. She has led several NSF-funded projects involving research & design of curriculum, assessments, tools, and environments that help develop 21st-century competencies in computing, data science, AI, and cybersecurity, as well as the integration of STEM, computer science and data science, while also addressing issues of neurodiversity, equity, and teacher preparation. She created, co-authored, and edited Computer Science in K-12: A-to-Z Handbook on Teaching Programming, a popular resource for preparing K-12 CS teachers. She has served as an advisor and/or member of several national and international efforts and taskforces related to advancing computational thinking, computing, and AI education at the K-12 level. Grover has a Ph.D. in Learning Sciences and Technology Design with a focus on K-12 CS Education (Stanford University), master's degrees in education (Harvard University) and computer science (CWRU, Cleveland), and bachelor's degrees in computer science and physics (India).

Lindsey Henderson

Member

Lindsey Henderson currently serves as the Policy Director, Mathematics for the national non-profit ExcellnEd. Prior to that, she worked as the Secondary Mathematics Specialist for the Utah State Board of Education. She is passionate about providing rich learning opportunities for all Utah mathematicians where learners are engaged in building and maintaining strong mathematical identities. She began her education career teaching all of the secondary maths for Salt Lake City School District. After her time in the classroom, she joined the Salt Lake City educational technology startup ecosystem where she built strong relationships to industry and honed her vision for relevant and meaningful mathematics for all. She returned to public education as the K-12 Mathematics Specialist for Davis School District where her ideas about humanizing mathematics for students were cultivated, supported, and allowed to flourish. Henderson is driven by a strong desire to provide relevant and meaningful mathematical experiences for students and educators through mathematical teaching, learning, and equity practices, and inquiry-based pedagogy.

Victor R. Lee

Member

Victor Raymond Lee is an Associate Professor in Stanford's Graduate School of Education and serves as the Faculty Lead for AI and Education at the Stanford Accelerator for Learning. His research involves the study and design of STEM learning experiences with an emphasis on supporting teaching and learning with data, AI literacy, and elementary computer science education. Lee is a past recipient of an NSF CAREER Award, AERA's Jan Hawkins Award, and a National Academy of Education/Spencer Foundation Postdoctoral Fellowship. He sits on the editorial boards of several leading education research journals and is past president and an elected Fellow of the International Society of the Learning Sciences. He was previously a member of the committee that produced the National Academy of Science, Engineering, and Medicine's consensus report Cultivating Interest and Competencies in Computing: Authentic Experiences and Design Factors. Lee completed his doctorate in Learning Sciences at Northwestern University and holds Bachelor's degrees in Cognitive Science and Mathematics from the University of California, San Diego.

Janice K. Mak

Member

Janice Kwok-Sau Mak is the Assistant Director of Curriculum & Pedagogy of Arizona State University's Learning Engineering Institute and clinical assistant professor at Mary Lou Fulton Teachers College. She has experience as a researcher, K-12 educator, and district administrator and serves on several state and national boards, including the Arizona State Board of Education and the Computer Science Teachers Association. Mak researches the intersection of equity in computer science and data science education, policy, and systems change. She is the recipient of an NSF CAREER, the Presidential Award for Excellence in Mathematics and Science Teaching, the International Society for Technology in Education (ISTE) Making IT Happen award, the ISTE Award for Advocacy, and the National Center for Women and Information Technology (NCWIT) Educator award, all of which continue were the result of her passion to create and sustain inclusive and equitable STEM learning opportunities for every student. Mak has a PhD in STEM curriculum and instruction.

Joshua M. Rosenberg

Member

Joshua M. Rosenberg is an associate professor of STEM education and faculty fellow at the Center for Enhancing Education in Mathematics and Sciences at the University of Tennessee, Knoxville. His research focuses on how learners think of and with data, particularly in science education settings. Rosenberg tries to understand how practices such as creating, representing, and modeling data create new opportunities for learning how to use data to pose and answer questions about scientific phenomena. In addition to how learners think of and with data, Rosenberg is also interested in student engagement across a range of STEM learning environments and the use of technology in education, particularly for teacher professional development. He participates on a number of NSF-funded advisory boards. He co-authored Data Science in Education Using R and is associated editor of the Journal of Statistics and Data Science Education. Rosenberg received his PhD in educational psychology & educational technology from Michigan State University.

Andee Rubin

Member

Andee Rubin is a principal scientist at TERC. She is a mathematician, computer scientist, and learning scientist who has been studying the growth of students' and teachers' statistical reasoning for over 30 years. She is a consultant for the New Jersey Department of Education and in that role is helping them develop resources to support their early data literacy standards. Rubin has led over twenty projects involving materials development, professional development and research on data science education, both in school and out of school, including in museums, science centers, zoos and aquariums. She is a member of American Educational Research Association, National Council of Teachers of Mathematics, International Statistical Institute/International Association for Statistics Education, and International Society for the Learning Sciences. Rubin has an undergraduate degree in mathematics from Brandeis University and graduate degrees in computer science and artificial intelligence from Massachusetts Institute of Technology.

Nancy Songer

Member

Nancy Butler Songer is the Associate Provost of Science, Technology, Engineering, and Mathematics (STEM) Education at the University of Utah. Her research work focuses on the design and evaluation of instructional materials for elementary and secondary-age learners' conceptual development of interdisciplinary STEM that results in the engineered design of solutions to local environmental challenges. Songer received a Presidential Faculty Fellowship (from President Clinton) and two Fulbright awards (Turkmenistan and Brazil). Songer was co-chair of the National Academy of Sciences, Engineering, and Medicine committee on Science and Engineering for Grades 6-12: Investigation and Design at the Center and a committee member assisting in recommendations for assessing complex thinking in science. Songer sits on the board of Navigator Labs, an educational nonprofit that develops learning platforms. Other awards include selection as an American Association for the Advancement of Science (AAAS) Fellow, an AAAS Women in STEM Superhero, and a Computerworld Smithsonian award for early work exploring the Internet's educational value. Songer holds a Ph.D. in Science Education from the University of California, Berkeley, an M.S. in Molecular/Developmental Biology from Tufts University, and a B.S. in Biological Sciences from the University of California, Davis.

John A. Underwood

Member

John A. Underwood currently serves as the K-12 STEM Specialist at the Louisiana Department of Education. Prior to this post, Underwood taught public school in grades 8-12 (STEM, Biology, and Career Technical Education) and conducted research on Computer Science and STEM Teacher training while assisting in creating open source curriculums. He has devoted most of his research into helping improve CS and STEM teachers' content knowledge, pedagogical practices, self-confidence, and their ability to utilize project based learning with self-reflection to guide student outcomes. Underwood was a 2020-2021 National CSTA Equity Fellow and co-authored Cyber.org's K-12 Cybersecurity Learning Standards. He helped build the LSU 9-12 Biomedical, Computing, Digital Design and Emergent Media, and Pre-Engineering Pathways. Underwood studied Sociology and Molecular Biology at Boston University before joining Teach For America and coming to Louisiana. While teaching full time, Underwood completed his Masters in Natural Sciences and PhD in Educational Leadership and Research at Louisiana State University.

Sepehr Vakil

Member

Sepehr Vakil is an associate professor of Learning Sciences in the School of Education and Social Policy at Northwestern University. Previously he was Assistant Professor of STEM Education and the Associate Director of Equity & Inclusion in the Center for STEM Education at the University of Texas at Austin. He has expertise broadly on issues of equity, race, and identity in STEM areas, with a disciplinary focus in computer science and engineering education. His work draws on a range of methods including qualitative, ethnographic, design, as well as archival and historical methods. Vakil received his Ph.D. in the Education in Mathematics, Science, and Technology program at UC Berkeley, and his B.S and M.S in Electrical Engineering from UCLA.

Aman Yadav

Member

Aman Yadav is the Lappan-Phillips Professor of Computing Education in the College of Education and College of Natural Science at Michigan State University with extensive experience in research, evaluation, and teacher professional development. His research and teaching focus on supporting educators to understand, apply, and critically evaluate the use of computing in K-12 classrooms. He leads several projects that design, implement, and assess how professional learning experiences can support teachers to bring computational tools and practices to support their disciplinary teaching. Yadav co-edited book, Computational Thinking in Education: A Pedagogical Perspective tackles how to integrate computational thinking, coding, and subject matter in relevant and meaningful ways. His work has been published in several leading journals, including Communications of the ACM, ACM Transactions on Computing Education, Journal of Research in Science Teaching, and Journal of Engineering Education.

Amy Stephens

Staff Officer