

Committee on Strengthening Science Education through a Teacher Learning Continuum

Chair

SUZANNE M. WILSON is a professor and Neag endowed professor of teacher education Department of Curriculum and Instruction at the University of Connecticut. Previously, Dr. Wilson was a university distinguished professor at Michigan State University (MSU), where she served as chair and professor in the Department of Teacher Education. Prior to joining the faculty at MSU, Dr. Wilson was the first director of the Teacher Assessment Project, which developed prototype assessments for the National Board for Professional Teaching Standards. While at MSU, she has collaborated on several large-scale research projects, including the National Center for Research on Teacher Education, the Educational Policy and Practice Study, and the National Partnership for Excellence and Accountability in Teaching. She has written on teacher knowledge, curriculum reform, educational policy, and teacher learning. She is currently co-principal investigator on the project Learning Science through Inquiry with the Urban Advantage: Formal and Informal Collaborations to Increase Science Literacy and Student Learning. Her interests include exploring various measures of teaching and teachers' understanding that might be used for teacher education and education research, as well as a study of the contemporary and jurisdictional battles over who should control teacher education and licensure. Dr. Wilson served on the NRC's Committee on Teacher Preparation Programs in the U.S. and the Center for Education's advisory board, and is currently a member of the NRC's Board on Science Education. Dr. Wilson has a B.A. in history and American studies from Brown University and an M.S. in statistics and a Ph.D. in educational psychology from Stanford University.

Members

BETSY DAVIS is an associate professor at the University of Michigan, School of Education. Her research integrates aspects of science education, teacher education, and the learning sciences. One major focus of Dr. Davis' work is a National Science Foundation-funded project, Elementary Educative Curricula for Teachers of Science (ELECTS). ELECTS explores the use of educative curriculum materials in supporting elementary teachers in ambitious science teaching. Other projects have included the NSF-funded Curriculum Access System for Elementary Science project on how preservice and new elementary teachers learn to teach inquiry-oriented science and how curriculum materials and technology can support those teachers' learning. Dr. Davis also helped lead the American Association for the Advancement of Science's Center for Curriculum Materials in Science—a center for teaching and learning focused on research and development around the use of curriculum materials in promoting teacher and student learning. Her experience also includes developing curriculum materials and serving as a teaching assistant for middle school science classes. Dr. 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. Dr. 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.

ZOE EVANS is an assistant principal at Central Middle School in Carrollton, Georgia. Before becoming an assistant principal in 2012, she served as a middle grades science teacher for 19 years in Florida and Georgia. Ms. Evans is a National Board Certified teacher in early adolescent science and a Georgia master teacher. She is the 2005 Georgia recipient of the Presidential Award of Excellence in Mathematics and Science Teaching. Ms. Evans has served as a member of the Georgia Department of Education Science Frameworks writing team, which created instructional models designed to help guide Georgia teachers in the implementation of the Georgia Performance Standards. Additionally, she is a member of the Georgia Science Education advisory committee. Ms. Evans is currently working with Achieve, Inc., as a member of the writing team for the Next Generation Science Education Standards. In addition to her work at the local, state, and national level, she serves as an active member of the Georgia Science Teachers Association and presents annually at the state conference. She has held several executive board positions and is currently president-elect of the organization. A native Georgian, Ms. Evans earned a bachelor's degree in middle grades education, master's degree in middle grades science, and specialist's degree in middle grade science from the University of West Georgia. Additionally, she has received certification in Educational Leadership from the University of West Georgia.

ADAM GAMORAN is president of the William T. Grant Foundation, which supports research on the education and development of young people. He was formerly the John D. MacArthur professor of sociology and educational policy studies and the director of the Wisconsin Center for Education Research at the University of Wisconsin-Madison. His research interests include school organization, stratification, and inequality in education. He recently concluded a large-scale randomized trial, supported by the National Science Foundation, on the impact of professional development to improve teaching and learning in elementary science in the Los Angeles Unified School District. Dr. Gamoran is a member of the National Academy of Education, and he has served on several NRC panels, including the Board on Science Education. In that capacity he chaired the Committee on Highly Successful Schools or Programs in K-12 STEM Education and the Committee on the Evaluation Framework for Successful K-12 STEM Education. For the U.S. Department of Education, he chaired the congressionally-mandated independent advisory panel of the National Assessment of Career and Technical Education, and he was twice appointed by President Obama to serve on the National Board for Education Sciences. Dr. Gamoran earned his Ph.D. in education from the University of Chicago.

KRIS D. GUTIÉRREZ is professor of literacy and learning sciences and holds the inaugural provost's chair at the University of Colorado, Boulder. She is also professor emerita of social research methodology in the Graduate School of Education & Information Studies at the University of California, Los Angeles, where she served as director of the Center for the Study of Urban Literacies. Her research interests address the relationship between literacy, culture, and learning. Specifically, her work focuses on the processes by which people negotiate meaning in culturally organized contexts, using language and literacies that are embedded within socio-historical traditions. Issues of equity and excellence are recurrent themes in her work. Dr. Gutiérrez is a past president and a fellow of the American Educational Research Association (AERA), and an elected member of the National Academy of Education. She has been an Osher fellow at the Exploratorium, and is a fellow at the National Conference on Research on Language and Literacy and at the National Education Policy Center. She has served on numerous

policymaking and advisory boards, including the U.S. Department of Education Reading First Advisory Committee and as a member of President Obama's education policy transition team. She has received numerous awards, including the AERA Hispanic Research in Elementary, Secondary, or Postsecondary Education Award and the inaugural AERA award for Innovations in Research on Diversity in Teacher Education. Dr. Gutiérrez holds an M.A. in English education, reading and English from Arizona State University, and a Ph.D. in English and education from the University of Colorado.

PAULA HOOPER is senior science educator and learning research scientist in the Institute for Inquiry at the Exploratorium. Dr. Hooper has been an elementary classroom teacher; worked on the design and teaching of inquiry-oriented science professional development experiences for K-8 teachers, administrators, and museum educators; and worked with youth in informal settings on robotics and using digital design fabrication for their creative activism. Her research and teaching addresses the uses of digital media to support science, technology, engineering, and mathematics (STEM) learning in formal and informal learning settings from a sociocultural perspective. She is also interested in the design and facilitation of online communication and cyberlearning projects that complement STEM professional development. Dr. Hooper has worked for TERC, the Massachusetts Institute of Technology, and Shaker Heights public schools. She has served on advisory boards for the Science Museum of Minnesota and the Technology Committee of the American Educational Research Association, and was a Warren Weaver fellow at the Rockefeller Foundation. Dr. Hooper holds a Ph.D. in media arts and sciences with a focus on epistemology and learning with digital media.

JUDITH WARREN LITTLE is dean of the Graduate School of Education, and professor of policy, organization, measurement, and evaluation at the University of California, Berkeley. Before becoming dean in 2010, Dr. Little had been on the U.C. Berkeley faculty since 1987. Her research interests center on the organizational and occupational contexts of teaching, with special attention to teachers' collegial relationships and to the contexts, policies, and practices of teachers' professional development. In pursuing these interests, she attempts to balance attention to the daily life of schools and the search for locally situated meanings, identities, and relationships with a broader view of the larger social, institutional, and policy environments in which the work of teaching resides. She was the co-principal investigator on a National Science Foundation, WestEd, and Heller Research Associates research project Effects of Content-Focused and Practice-Based Professional Development Models on Teacher Knowledge, Classroom Practice, and Student Learning in Science. An elected member of the National Academy of Education, she has received numerous awards, including being named a fellow of the American Educational Research Association, the Frank H. Klassen Award for scholarly contributions in teacher education, and the Spencer Foundation Faculty Mentor Award. Dr. Little has a B.A. from the University of Colorado, and a Ph.D. in sociology from the University of Colorado.

JULIE LUFT is the inaugural athletic association professor of science and mathematics education at the University of Georgia. Her previous professional experience includes teaching science in middle and high school. Dr. Luft's areas of research expertise are science teacher education (preservice and inservice), mixed-methods research, and science teacher beliefs and practices. She has served as a board member and president of the Association of Science Teacher

Educators (ASTE) and as a council member for the National Science Teachers Association (NSTA). She is currently the research director of NSTA, a board member of NSTA, and the NSTA representative to the National Association for the Research in Science Teaching (NARST) board. In 2009, Dr. Luft was a scholar in residence at NSTA and was selected as a mentor in the first Summer Research Institute by NARST for graduate students in science education. She was an invited mentor at the South African Association for Research in Science, Mathematics, and Technology Education Summer School, and she received the ASTE outstanding science teacher educator award. She is a fellow of the American Association for the Advancement of Science. Dr. Luft has a B.S.Ed. in life sciences from the University of New Mexico, an M.A. in science education and ecology from the New Mexico Institute of Mining and Technology, and a Ph.D. in science education from the University of Iowa.

BARBARA MILLER is a vice president at Education Development Center and associate director of EDC's Learning and Teaching Division. A national expert in professional development for districts and schools, Dr. Miller conducts research on professional development and teacher leadership; provides technical assistance to programs and districts; and creates materials for teachers, teacher leaders, and administrators. Dr. Miller directs the award-winning *Success at the Core* project, a video-based professional development toolkit designed to improve instructional quality in classrooms and among school leadership teams. She has conducted research on knowledge management for the National Science Foundation's Math and Science Partnership program, by synthesizing and sharing knowledge from the field around teacher leadership and professional learning communities; consulted with numerous districts on leadership development efforts; evaluated systemic reform initiatives; and provided assistance to underperforming schools and districts. A former middle school teacher and teacher educator, Dr. Miller has co-authored numerous articles, chapters and books on teacher leadership and school reform. Dr. Miller has a B.A. from Carleton College and an Ed.D. from Harvard University.

KATHLEEN ROTH is director of the Center for Professional Development at Biological Sciences Curriculum Study, where she is involved in the development of research-based approaches to professional development. One example is the NSF-funded project Science Teachers Learning from Lesson Analysis. This scale-up study is designed to confirm findings that student learning improves when teachers' professional development experiences include examination of videocases of science teaching that deepen their content and pedagogical content knowledge and improve their teaching practice. Formerly, Dr. Roth was a middle and high school science teacher. Later, as a teacher educator and researcher at Michigan State University, she taught elementary school science and studied her own practice and her students' learning. She also served as director of the LessonLab Research Institute, where her research examined science teaching in classrooms. Dr. Roth received a B.S. in biology from Duke University, an M.S. in secondary science teaching from Johns Hopkins University, and a Ph.D. in science education from Michigan State University.

IRWIN SHAPIRO is a Timken University professor at Harvard University. Dr. Shapiro was the former director of the Harvard-Smithsonian Center for Astrophysics (CFA), where he was instrumental in the Center's research initiatives including the development of powerful telescopes and the establishment of a science education department. Prior to joining CFA, Dr. Shapiro spent 26 years at MIT as a research staff assistant, and as a professor of geophysics and

physics. He has been active on a number of academic and government advisory boards, including the NASA Advisory Council and the National Academies' Space Science Board. As a member of both the National Academy of Sciences and the American Academy of Arts and Sciences, Dr. Shapiro has served as a member of the Radio Science teams for the Mariner, Viking and Pioneer Venus spacecraft missions. More recently, Shapiro has devoted his interest to precollege and college science education, and has for years worked on curriculum development and teacher training. Dr. Shapiro has been the recipient of a number of awards, among them the New York Academy of Sciences Award in Physical and Mathematical Sciences in 1982; the Charles A. Whitten and William Bowie medals of the American Geophysical Union, and the Einstein Medal in 1994. Dr. Shapiro received a B.S. in mathematics from Cornell University, and an M.A. and Ph.D. in physics from Harvard University.

PATRICK M. SHIELDS is director of the Center for Education Policy at SRI International. Dr. Shields' research focuses on effective educational policies and teaching practices for economically poor and ethnically diverse populations. Currently, he is the co-principal investigator of the Science Learning Activation Lab, a national research and design effort to strengthen science teaching and learning in the United States. Since 1999, he has served as the director of research for statewide policy and research initiative to improve the teacher workforce in California. Dr. Shields is also principal investigator of a national randomized trial assessing the efficacy of the National Writing Project, a professional development program to improve the teaching of writing. Dr. Shields has served on the NRC committees on the Influence of Standards in Mathematics, Science, and Technology and Lessons Learned from Large-Scale Reforms in K-12 STEM Education. He was a senior policy advisor to the Center for Research on Educational Diversity and Excellence at the University of California and a member of the National Council for Teacher of Mathematics Standards Impact research group. He is currently a member of the committee of visitors for the Center for Informal Learning and Schools and is a member of the editorial board of *Education Evaluation and Policy Analysis*. Dr. Shields holds a Ph.D. in educational policy from Stanford University.

WARREN SIMMONS is executive director of the Annenberg Institute and co-directs its work in community-centered education reform at Brown University. He also co-chairs the Aspen Urban Superintendents Network and the Working Group on School Transformation in New York City. Before joining the Annenberg Institute, he was founding director of the Philadelphia Education Fund, a local reform support organization that helped the School District of Philadelphia to fund, develop, and implement new academic standards, content-based professional development, standards-based curriculum resources, and comprehensive school reform. Previously, at the Annie E. Casey Foundation, he developed and funded initiatives on community development and urban school reform. He also served as director of equity initiatives for the New Standards Project and as special assistant to the superintendent of schools in Prince George's County, Maryland, where he planned and/or implemented district wide initiatives on improving the achievement of traditionally underserved students. He is a recent recipient of the Distinguished Citizens Award from the National Governors Association and has served on the advisory groups or boards of several national organizations for science education. He was chair of the Rhode Island Urban Education task force and a member of the National Commission on Civic Investment in Public Education. Dr. Simmons received a B.A. in psychology from Macalester College, and a Ph.D. in psychology from Cornell University.

MARK WINDSCHITL is a professor of science teaching and learning at the University of Washington. His research interests deal with the early career development of science teachers—in particular shaping their trajectories toward ambitious and equitable pedagogy. He has recently been principal investigator (PI) on two projects that tracked science teachers from preparation through their first year of teaching; one of these was funded by Carnegie and the other by the National Science Foundation. His research group has prototyped a set of high-leverage practices for K-12 science instruction that represent a “beginner’s repertoire” and has tested the conditions under which these core practices, with the help of specially designed tools to support the intellectual work of teaching, can be appropriated as novices begin their professional careers in high-needs schools. Work from this and related projects has appeared in *The American Educational Research Journal*, *Teachers College Record*, *Cognition and Instruction*, *Phi Delta Kappan*, *Science Education*, and in papers commissioned by the National Research Council and the National Academy of Science. Dr. Windschitl is also PI on a Noyce Teaching Scholars grant at the University of Washington. This program supports teachers in their training and induction as they begin work in urban schools. He also co-administrates the Annenberg Fellowship program—also known as the Rhodes Scholarships of Teaching—for teachers at the UW. He is the recipient of the 2002 AERA Presidential Award for Best Review of Research, and an author of the chapter on Science Teaching in the new *AERA Handbook of Research on Teaching*. Dr. Windschitl received a B.S. in zoology, an M.S. in education research and evaluation, and a Ph.D. in education in curriculum and instruction from Iowa State University.

JAMES WYCKOFF is a professor in the Curry School of Education and director of the Center on Education Policy and Workforce Competitiveness at the University of Virginia. Currently, he is examining attributes of teacher preparation programs and pathways and induction programs that are effective in increasing the retention of teachers and the performance of students. He is principal investigator on grants from the National Science Foundation and several foundations to explore policies on teacher preparation, recruitment, and retention and on the quality of the teaching workforce and outcomes for students. He has written widely on issues of education finance, including teacher compensation and teacher recruitment and retention of teachers in New York State. Dr. Wyckoff has served on several NRC committees, including the committee on the Study of Teacher Preparation Programs in the United States. He also serves on the scientific review panel of the U.S. Department of Education, the editorial board of *Education Finance and Policy*, and several other advisory panels. He is a past president of the American Education Finance Association. Dr. Wyckoff received a B.A. in economics from Denison University, and a Ph.D. in economics from the University of North Carolina.

CARLA ZEMBAL-SAUL is a professor of science education at The Pennsylvania State University, where she holds the Gilbert and Donna Kahn endowed professorship in STEM education. Dr. Zemba-Saul is also the head of the Department of Curriculum and Instruction. Most of her research takes place in the context of school-university partnership projects, and it investigates the development of teaching practices that support K-6 children’s participation in authentic scientific discourse and practices. The purposeful integration of technology tools has played a central role in her teaching and research. In particular, Dr. Zemba-Saul has developed online video-based cases of reform-oriented science teaching, used video analysis tools with preservice and practicing teachers, examined the use of software scaffolds to support meaningful

science learning, and implemented electronic teaching portfolios in teacher education. She is an elected member of the executive board for the National Association for Research in Science Teaching, and she chairs the organization's publications advisory board. Her previous experience includes teaching science in middle school. Dr. Zembal-Saul received a B.S. in science education from the University of Michigan, an M.S. in science education from the University of Houston, and a Ph.D. in science education from the University of Michigan.