About the Contributors

**Myint Swe Khine** is a Professor in the field of Learning Sciences and Technology and Head of Graduate Programs and Research at the University of Bahrain. He received his Master degrees from the University of Southern California, Los Angeles, USA, and the University of Surrey, Guildford, UK, and his Doctor of Education from Curtin University of Technology, Australia. He worked in the Learning Sciences Technology Academic Group at Nanyang Technology University, Singapore, for several years. He publishes widely in academic journals and has edited some books. Recent publications include *Learning to Play: Exploring the Future of Education with Video Games* (Peter Lang, USA), *Advances in Nature of Science Research: Concepts and Methodologies* (Springer, 2012), and *Perspectives on Scientific Argumentation: Theory, Practice, and Research* (Springer, 2012).

**Issa M. Saleh** is the Head of Education Studies Division and Associate Professor at the University of Bahrain. He received Bachelor of Science, Master, and Doctorate in Education from the University of North Florida, Jacksonville, USA. Dr. Issa’s credentials include the distinctive professional certification required to teach Science and administrate schools (K-12) in the State of Florida, USA. He has taught at A. Phillip Randolph Academy of Technology (APR) for several years and also taught at Emirates College for Advanced Education, University of North Florida, University of Atlanta, and Florida Community College in Jacksonville Florida, USA. Dr. Issa was the science department head and principal investigator in understanding of science teaching and learning at APR for in-service science teachers for several years and later the Dean of Students Services and Curriculum Instruction at APR. His most recent books are *Fostering Scientific Habits of Mind: Pedagogical Knowledge and Best Practices in Science Education* (Sense Publishers, 2009), *Transformative Leadership and Educational Excellence: Learning Organizations in the Information Age* (Sense Publishers, 2009), *New Science of Learning: Computers, Cognition and Collaboration in Education* (Springer, 2010), and *Teaching Teachers: Approaches in Improving Quality of Education* (Nova Science Publishers, 2011).

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**Matthew J. Benus**, Ph.D., is an Assistant Professor of Education at Indiana University Northwest where he teaches science methods. His current research interests focus on dialogic interactions in a science classroom with students and teacher. Additionally, he researches how science teachers establish and refine whole-class dialogue around knowledge construction, consensus-making, and critique, while using argument-based inquiry.
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Saouma BouJaoude graduated from the University of Cincinnati, Cincinnati, Ohio, USA, in 1988 with a Doctorate in Curriculum and Instruction with emphasis on science education. After serving as an Assistant Professor of Science Education at the Department of Science Teaching, Syracuse University, Syracuse, New York, USA, he joined the faculty of the American University of Beirut in 1993. Dr. BouJaoude served as Director of the Science and Math Education Center, Chair of the Department of Education, and is presently director of SMEC and the Center of Teaching and Learning. Dr. BouJaoude has published in international journals such as the *Journal of Research in Science Teaching, Science Education*, and the *International Journal of Science Education*, has written chapters in edited books in English and Arabic, and has been an active presenter at local, regional, and international education and science education conferences. Dr. BouJaoude serves on the editorial boards of a number of science education journals.

Todd Campbell is an Associate Professor at Utah State University. His research focuses on factors influencing current reform in science education. This is supported by investigating science teacher professional development, scientific inquiry/modeling instructional practices, and science/technology integration. Dr. Campbell is the principal investigator for a National Science Foundation project focused on integrating technology into science instruction and a state-level Mathematics Science Partnership professional development project partnering science teachers and scientists in curriculum development. He has published in *International Journal of Science Education, Journal of Science Teacher Education*, and *Journal of Science Education and Technology*, among others.

Douglas B. Clark is an Associate Professor of Science Education at Vanderbilt University. Clark completed his Doctoral and Postdoctoral work at UC Berkeley and his Master’s at Stanford. His research analyzes students’ science learning processes in technology-enhanced environments, simulations, and digital games with a particular focus on conceptual change, representations, and argumentation in these environments. Clark’s current work focuses specifically on digital games to support students’ understanding of core science concepts by integrating and overlaying popular game dynamics with (a) formal science concepts and representations and (b) supports for engaging students in critique and argumentation about the underlying science concepts.

Renee Clary is co-founder of EarthScholars Research Group, which seeks to improve the public’s scientific literacy through the optimization of interdisciplinary geological-biological instruction. The EarthScholars group conducts research in multiple educational settings, including informal, traditional, and online environments. Renee Clary is an Assistant Professor of Geology in the Department of Geosciences, College of Arts and Sciences, at Mississippi State University. She also serves as the Director of the Dunn-Seiler Museum on Mississippi State University’s campus. She was elected fellow of the Geological Society of London in 2006, and received the Mississippi Science Teachers Association Outstanding College Science Teacher Award in 2011. She has authored 35 research articles in journals, 15 chapters within compendia, and more than 50 publications in electronic media and proceedings.
Danielle Dani holds a B.S. in Biology and a M.S. in Biology. She received her Ed.D. in Curriculum and Instruction from the University of Cincinnati. Dr. Dani teaches graduate and undergraduate courses in science education and teacher education. Her major research interests include the beliefs and practices of teachers engaged in teaching culturally responsive, place-based science through the methods and perspectives of inquiry and problem solving.

Hasan Deniz is an Assistant Professor of Science Education at University of Nevada Las Vegas. He teaches undergraduate, Masters, and Doctoral level courses in the Science Education Program at University of Nevada Las Vegas. His research agenda includes epistemological beliefs in science and evolution education.

Eric Frauman is an Associate Professor at ASU and also teaches in Health, Leisure, and Exercise Science. His teaching specialties include outdoor recreation resource management, nature-based tourism, and risk management. His interests are in non-formal education and expertise in evaluation and research methods.

Lisa Gross is an Assistant Professor in Curriculum and Instruction at Appalachian State University in Boone, North Carolina. Her research interests include the identity development of elementary pre-service educators and candidates’ comfort in teaching science content. At present, she is exploring how the early socialization experiences of elementary teaching candidates influence their attitudes toward teaching science-related concepts in the outdoors.

Tina Grotzer is an Associate Professor at the Harvard Graduate School of Education, a Principal Investigator at Harvard Project Zero, and a faculty member at the Center for Health and the Global Environment at Harvard Medical School. She directs the Understandings of Consequence Project, funded by the National Science Foundation. She is a cognitive scientist whose work considers how people reason about causal complexity. She studies the kinds of default assumptions that people typically make when learning new complex scientific information and how to best frame scientific research for public understanding. She was recently awarded an NSF Career award.

Brian Hand, Ph.D., is Professor of Science Education at the University of Iowa. His research focuses on two major areas. The first is on how we can use language as a learning tool to improve students’ understanding of science. The second area of research is the development of scientific argument through the use of the Science Writing Heuristic (SWH). This research is aimed at helping students learn about and use science argument to construct science knowledge. To support these efforts, in the last five years he has received funding from NSF and both Federal and State Departments of Education.

Rola Khishfe is an Assistant Professor at the American University of Beirut (aub). She received the Ph.D. in Science Education from Illinois Institute of Technology; M.A. in Science Education, Certification in Teaching Secondary Science, and B.S. in Biology from AUB. Prior to joining AUB as faculty, she was an Assistant Professor at Loyola University, Chicago, and has also had teaching experience at the elementary, middle, and high school levels. She has served on the editorial and review boards of...
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several journals. She has published in prestigious science education journals such as *Journal of Research in Science Teaching* and *International Journal of Science Education*. Dr. Khishfe’s research interests focus on the teaching and learning about nature of science, argumentation, and decision making in relation to socioscientific issues.

**J. Joy James** teaches in the Health, Leisure, and Exercise Department at Appalachian State University. She has spent 10+ years teaching in both the non-formal and outdoor education fields before coming to academia. Her research interests include outdoor education, environmental interpretation, and management of outdoor recreation.

**Syh-Jong Jang** is a Professor at the Graduate School of Education and Center for Teacher Education, Chung Yuan Christian University in Taiwan. He received his PhD in Science Education from the University of Texas at Austin. His expertise is PCK and TPACK, Educational Technology in Teacher Education and Innovative Science Teaching. He have published many articles in distinguished Journals and also served as a reviewer in *Computers & Education*, *Educational Researcher*, *Higher Education*, and *International Journal of Science Education*.

**Angela M. Kelly** is Assistant Professor of Physics and Astronomy at Stony Brook University, and serves on the Doctoral faculty of the Center for Science and Mathematics Education (CESAME). She earned her Ph.D. in Science Education from Columbia University. Her research interests include inequities in secondary physics access, science teacher recruitment and retention, and pedagogical content knowledge in the physical sciences. She has recently published articles in *American Journal of Physics*, *School Science & Mathematics*, *The New Educator Journal*, *Journal of Curriculum & Instruction*, *The Physics Teacher*, and *Science Educator*. In 2010, she received the Provost’s Faculty Recognition Award for Excellence in Scholarship and Research from Lehman College, City University of New York.

**Edward Lyon** is an Assistant Professor at Mary Lou Fulton Teachers College at the Arizona State University. A former high school science teacher, Dr. Lyon has been actively involved in classroom-based research projects that explore K-12 science teaching and assessing for linguistically diverse students. His own research aims to better understand how science teachers assess student learning and become prepared to assess in linguistically diverse classrooms. Mr. Lyon has been awarded a University of California All Campus Consortium on Research for Diversity (UC/ACCORD) dissertation fellowship to support his dissertation research that explores the changes in preservice science teachers’ assessment expertise.

**Jeff C. Marshall**’s work and expertise has led to national recognition in teaching and research. Jeff serves as Director for the Inquiry in Motion Institute and Co-Director for the Center of Excellence for Inquiry in Mathematics and Science at Clemson University. Further, Jeff earned the Presidential Award of Excellence for Mathematics and Science Teaching; he is Nationally Board Certified in AYA Science, he continues to write and present work on inquiry teaching and learning in science education, and he consults regularly with universities and school districts across the nation.
**Mario Martinez-Garza** is a pre-Doctoral fellow of Learning Sciences and Learning Environment Design at Vanderbilt University. His main areas of interest are investigating the potential of play as a vehicle for learning through cognitive perspectives, and applications of theory-based design principles to support learning through game environments of all kinds. He holds a Master’s degree in Education and has served as a middle-school math and science teacher, and as a game designer for several commercial and educational games companies.

**Drew Nielson** is a Physics Teacher at Logan High School, Logan, Utah. He has been teaching AP Physics, General Physics, and Chemistry for 15 years. While teaching science is his primary focus, he has collaborated with Dr. Todd Campbell to develop new techniques and methods of teaching physics. He is currently developing ways that Model-Based Inquiry can be used effectively in physics courses. He has published in *The Science Teacher, Journal of Science Education and Technology,* and *Science Activities.* In addition, he was a presenter at the Association for Science Teacher Education (ASTE) 2011 International Conference.

**Lori Norton-Meier,** PhD., is an Associate Professor of Literacy Education at the University of Louisville. Her current research projects include The Science Literacy Project, a series of studies on inquiry-based science and literacy, and an ethnographic lifespan study of play and literacy.

**Phil Seok Oh** is an Associate Professor at Gyeongin National University of Education, Korea. His research focus is on scientific reasoning and discourse in the contexts of abductive inquiry of earth science and modeling. He, as a science teacher educator, has collaborated extensively with pre- and in-service science teachers, and produced science curriculum materials and relevant research reports. He was a visiting research professor at Utah State University, supported by the National Research Foundation of Korea. He has published in *Science Education,* *International Journal of Science Education,* and *Journal of Korean Association for Science Education,* among others.

**Erin Peters-Burton** is an Assistant Professor of Educational Psychology and Science Education at George Mason University. Her research agenda focuses on how self-regulated learning processes help students who feel excluded in science classes become more aware of the scientific enterprise and how scientific knowledge is generated. Her fifteen years of experience as a secondary science teacher informs her research on enhancing student scientific epistemologies. She has published extensively on self-regulated learning processes, student-centered learning, and the nature of science. Dr. Peters-Burton has won national awards including Albert Einstein Distinguished Educator Fellow and Virginia University Science Educator of the Year.

**Sara Salloum** is an Assistant Professor of Science and Adolescent Urban Education at Long Island University – Brooklyn. She completed a Masters in Science Education at the American University of Beirut and Ph.D. at the University of Illinois at Urbana-Champaign. Prior to her Ph.D., Dr. Salloum was a science teacher in Lebanon. She currently teaches secondary school curriculum and methods and teacher-conducted inquiry courses. Dr. Salloum’s research is on teacher knowledge and its development towards equitable inquiry-based teaching. Specifically, she studies the role of collaborative practitioner inquiry in supporting new teachers’ pedagogic growth along different domains: academic and practical-moral knowledge, and the craft of teaching.
About the Contributors

Pratim Sengupta is a learning scientist and a physicist whose interests are located along two strands of learning sciences research: design and cognition. At Vanderbilt, he directs the Mind, Matter, and Media Lab. He is particularly interested in studying how new forms of computational representational systems (e.g., multi-agent-based modeling, tangible programming, etc.) can lead to rethinking how knowledge is represented in various scientific domains (with a particular emphasis on physics), and the implications for learnability of those domains.

Meng-Fang Tsai received her Bachelor in Food Science from Tunghai University, Taiwan, Master in Secondary Education from Indiana University, South Bend, USA, and Ph.D. in Educational Psychology from Purdue University, West Lafayette, USA. Her research interests focus on students’ cognitive engagement, self-regulated learning, and the influence of these two theoretical concepts on students’ acquisition and application of scientific literacy as well as instructional practices involved in the process. She currently expands her research to science teachers’ development of PCK and TPACK. She is also interested in the employment of quantitative content analysis in the research of science education.

M. Shane Tutwiler holds a Master of Education degree with distinction from the Harvard Graduate School of Education, where he is currently a Doctoral candidate in Human Development and Education. He is an experienced science teacher with a background in nuclear engineering. His research interests focus on the use of technology and cognitive science to enhance science education.

James Wandersee is co-founder of the EarthScholars Research Group, which focuses on designing innovative visual approaches that integrate and improve botanical and geological instruction, with the aim of increasing public understanding of science. He is the W. H. LeBlanc Alumni Association Professor (Biology Education) in the Department of Educational Theory, Policy, and Practice in Louisiana State University’s College of Education. He was elected a lifetime fellow of the Linnean Society of London and of the American Association for the Advancement of Science—Biological Sciences section. He received the 2007 Charles Edwin Bessy Medal from the Botanical Society of America “for inspiring students and the public to explore and appreciate the wonders of botany.” His books, articles, and professional presentations span more than 40 years and 15 countries; they have been translated into seven languages.

Morgan B. Yarker is a PhD candidate in the Science Education program at the University of Iowa. She has a B.S. in Meteorology and a M.S. in Atmospheric Science, which has aided her work in using computer-based weather forecast models. Her current research in science education looks at dialogic interactions among students as they work towards understanding science models.