KRISTIN L. GUNCKEL

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CHRONOLOGY OF EDUCATION

2008	Ph.D., Curriculum, Teaching and Educational Policy, Michigan State University Focus: Science Education
1998	Secondary Science Teaching Certification, University of New Mexico
1990	M. S., Geology, University of Montana
1987	B. S., Geology, (Minor: Watershed Science), Colorado State University

CHRONOLOGY OF EMPLOYMENT

University Research and Teaching

2020 – Present	Professor of Science Education, University of Arizona Department of Teaching, Learning, & Sociocultural Studies
2014 – 2020	Associate Professor of Science Education, University of Arizona Department of Teaching, Learning, & Sociocultural Studies
2008 - 2014	Assistant Professor of Science Education, University of Arizona Department of Teaching, Learning, & Sociocultural Studies

K-12 Classroom Teaching

2003	Middle School Science Teacher (6^{th}, 7^{th}, 8^{th} grades) Mid-Michigan Public School Academy, Lansing, Michigan
2001-2002	7^{th} - Grade Science Teacher, 21st Century Public Academy Albuquerque, New Mexico
1999 - 2001	8^{th} - Grade Earth Science Teacher, Garfield Middle School, Albuquerque Public Schools, Albuquerque, New Mexico

Environmental Education

1994-1999	Lead Teacher, Sandia Mountain Natural History Center New Mexico Museum of Natural History & Science, Albuquerque, New Mexico
1993-1994	Program Co-Coordinator, Cascade Science School, Bend, Oregon Oregon Museum of Science & Industry, Portland, Oregon
1990-1993	Program Co-Coordinator, Hancock Field Station, Fossil, Oregon Oregon Museum of Science & Industry, Portland, Oregon

Geology Field Experience

1989	Physical Science Technician U. S. Bureau of Mines, Western Field Operations Center, Spokane, Washington

1987 Physical Science Technician
U. S. Geological Survey, Water Resource Division, Lakewood, Colorado

HONORS AND AWARDS

2016 Outstanding Mentor of Graduate/Professional Students, University of Arizona Graduate & Professional Student Council

2007 Multicultural/Cross-Cultural Program Award for the GLBT Safe Schools Group, Michigan State University

1999 Innovative Teaching Award,
Environmental Education Association of New Mexico

1998 Excellence in Environmental Education,
U.S. Environmental Protection Agency, Region VI

1992 President's Award for Excellence,
Oregon Museum of Science & Industry

PUBLICATIONS

Book Chapters

Gunckel, K. L., Covitt, B. A., Bianchini, J. A., (In review). Using learning progressions to develop curriculum materials. In Jin, H., Yan, D., Krajcik, J. (Eds.), Handbook on Science Learning Progressions.

Gunckel, K. L., Wyner, Y., & Love, G. (2021). Patterns. In Nordine, J. and Lee, O. (Eds.), *Crosscutting concepts: Strengthening science and engineering learning* (pp. 63-88). NSTA Press.

Gunckel, K. L., (2019). What does queer theory have to do with teaching science in elementary schools? In S. Fifield & W. Letts (Eds.), *STEM of Desire* (pp. 147-159). Leiden, The Netherlands: Brill Publications.

Gunckel, K. L., Mohan, L., Covitt, B. A., & Anderson, C. W. (2012). Addressing challenges in developing learning progressions for environmental science literacy. In A. Alonzo & A. W. Gotwals (Eds.), *Learning progressions in science* (pp. 39-76). Rotterdam, The Netherlands: Sense Publications.

Refereed Journal Articles

Gunckel, K.L., Covitt, B.A., Berkowitz, A. R., Caplan, B., Moore, J. C. (2022, Early View). Computational thinking for using models of water flow in environmental systems: Intertwining three dimensions in a learning progression. *Journal of Research in Science Teaching*. doi.org/10.1002/tea.21755

Gunckel, K. L., Covitt, B. A., Love, G., Cooper-Wagoner, J., & Moreno, D. L., Jr. (2022). Unplugged to plugged-in: Teaching computational thinking using models of groundwater contamination. *The Science Teacher* 89(3), 46-51.

Caplan, B., Covitt, B., Love, G., Berkowitz, A., Gunckel, K., McClure, C., & Moore, J. (2021). Using computational thinking and modeling to build water and watershed literacy. *Connected Science Learning*, *3*(2).

Canipe, M., & Gunckel K. L. (2020). Imagination, brokers, and boundary objects: Interrupting the mentor-preservice teacher hierarchy when negotiating meanings. *Journal of Teacher Education*, 71(1), 80-93. doi.org/10.1177/0022487119840660

Gunckel, K. L. (2019). Repairing elementary school science. *Theory into Practice*, 58(1), 71-79. Doi.org/10.1080/00405841.2018.1536918

Gunckel, K. L., Covitt, B. A., & Salinas, I. (2018). Learning progressions as tools for supporting teacher content knowledge and pedagogical content knowledge about water in environmental systems. *Journal of Research in Science Teaching*, 55(9), 1339-1361. doi.org/10.1002/tea.21454

Gunckel, K. L., & Tolbert, S. (2018). The imperative to move toward a dimension of care in engineering education. *Journal of Research in Science Teaching,* 55(7), 938-961. doi.org/10.1002/tea.21458.

Covitt, B. A., Gunckel, K. L., Caplan, B., & Syswerda, S. (2018). Teachers' use of learning progression-based formative assessment in water instruction. *Applied Measurement in Education,* 31(2), 128-142. doi.org/10.1080/08957347.2017.1408627.

Gunckel, K. L., & Wood, M. B. (2016). The principle–practical discourse edge: Elementary preservice and mentor teachers working together on co-learning tasks. *Science Education*, 100(1), 96-121. doi.org/10.1002/sce.21187

Arenas, A., Gunckel, K. L., & Smith, W. L. (2016). Seven reasons for accommodating transgender students at school. *Kappan Magazine*, 98(1), 20-24.

Gunckel, K. L. (2013). Fulfilling multiple obligations: Preservice elementary teachers' use of an instructional model while learning to plan and teach science. *Science Education, 97*(1), 139-162.

Gunckel, K. L., Covitt, B. A., Salinas, I., & Anderson, C. W. (2012). A learning progression for water in socio-ecological systems. *Journal of Research in Science Teaching*, 49(7), 843-868.

Gunckel, K. L. (2011). Mediators of a preservice teacher's use of the Inquiry-Application Instructional Model. *Journal of Science Teacher Education*, 22(1), 79-100.

Gunckel, K. L. (2010). Using experiences, patterns, and explanations to make school science more like scientists' science. *Science and Children*, 48(1), 46-49.

Covitt, B. A., Gunckel, K. L., & Anderson, C. W. (2009). Students' developing understanding of water in environmental systems. *Journal of Environmental Education, 40*(3), 37-51.

Gunckel, K. L. (2009). Queering science for all: Probing queer theory in science education. *Journal of Curriculum Theorizing*, 25(2), 62-75.

Schwarz, C., Gunckel, K. L., Smith, E. L., Bae, M. J., Covitt, B., Enfield, M., & Tsurusaki, B.K. (2008). Helping elementary preservice teachers learn to use science curriculum materials for effective science teaching. *Science Education*, 92(2), 345-377.

Gunckel, K. L. (1999). Ecosystem explorations: Connecting an ecology field experience to the classroom. *Science and Children*, 37(1), 18-23.

Gunckel, K. L. (1994). Research-based geology and paleontology education for elementary- and secondary-school students. *Journal of Geological Education*, 42(5), 420-423.

Conference Proceedings (Peer-Reviewed)

Gunckel, K. L., (2022). Expanding environmental science literacy to include cultural and community knowledge. In Colglazier, E. W. (Hon), Vafia, H. A., & Lansey, K. E. (eds), *Sustainable development for the Americas: Science, health and engineering policy and diplomacy*, (pp. 320-326). CRC Press.

Wood, M.B. and Gunckel, K.L. (2017). Do you see what I see? Connecting mathematics to the real world. In Galindo, E. & Newton, J. (Eds.), *Proceedings of the 39th Annual North American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1218-1221). Indianapolis, IN: Hoosier Association of Mathematics Teacher Education.

Invited Publications

Salinas, I., Covitt, B. A., & Gunckel, K. L. (2013). Sustancias en el agua: Progresiones de aprendizaje para diseñar intervenciones curriculares. *Educacion Quimica*, 24(4), 391-398.

Caplan, B., Gunckel, K. L., Warnock, A., & Cano, A. (2013). Investigating water pathways in schoolyards. *Green Teacher, 98* (Winter), 28-33.

Gunckel, K. L. (1990). McCartney Mountain intrusion: A bulged sheet intrusion emplaced along a thrust fault during thrust movement. *Northwest Geology*, 19(1), 14-22.

Other Publications

Gunckel, K. L. & Greteman, A. J. (2007) [Review of the book Creating safe environments for LGBT students: A Catholic schools perspective]. Education Reviews, March 2007 http://edrev.asu.edu/brief/mar07.html#1

Anderson, C. W., Gunckel, K., and Covitt, B. (2006). Preparing for the real enemy: Failure to understand science is a national-security issue and not for the reasons you think. *Education Week*, 26(3).

Curriculum Materials (Selected)

Comp Hydro AZ (2016, 2017, 2018). Curriculum materials for integrating hydrology, data interpretation, and computational thinking to understand 1,4Dioxane contamination related to the Tucson Airport Remediation Project (TARP). NSF supported. Lead developer.

Schoolyard Water Pathways (2012). Culturally Relevant Ecology, Learning Progressions and Environmental Literacy Project, Colorado State University. Middle and high school curriculum materials for tracing water through environmental systems. NSF supported. Co-developer.

Earth Processes, Middle School (2007). Promoting Rigorous Outcomes in Mathematics and Science Education (PROM/SE). Michigan State University. Curriculum materials for teacher professional development focusing on earth science. NSF supported. Co-developer.

Water for People and the Planet. (2007). Center for Curriculum Materials in Science. Michigan State University. High school curriculum unit to support students in understanding water quality and supply issues. NSF supported. Lead Developer.

Michigan Rocks. (2005). Center for Curriculum Materials in Science. Michigan State University. Introductory geology lessons created for science methods courses for preservice elementary teachers. NSF supported. Lead Developer.

Ecosystem Explorations. (1997, 1998). New Mexico Museum of Natural History and Science. Albuquerque, NM. Lessons for fifth-grade teachers to use with students prior to and following a visit to the Sandia Mountain Natural History Center. Lead Developer

SCHOLARLY PRESENTATIONS

Invited Presentations

Gunckel, K. L., (2021, February). *Learning progressions for how students make sense of water in environmental systems*. Presentation at the National Consortium for Teaching about Asia, University of Pittsburg.

Gunckel, K. L. (2017, November). *Environmental literacy for and about communities*. In J. Moore (Chair), Environmental science literacy: A framework for addressing 21st century environmental challenges. Invited presentation at the Natural Resources Ecology Laboratory 50th Anniversary Symposium, Colorado State, University, Fort Collins, CO.

Gunckel, K. L., (2017, March). *What does queer theory have to do with teaching science in elementary schools?* Deep Dish, Institute of LGBT Studies, University of Arizona.

Gunckel, K. L., (2017, March). K-12 Education and the Science Community Panelist, March for Science, Tucson, Arizona

Gunckel, K. L. & Koestler, C., (2015, February). *Speaking Out: Educating teachers to be Allies for LGBTQ-identified students, families, and communities.* Invited presentation at the annual meeting of the Association of Teacher Educators, Phoenix, AZ.

Gunckel, K. L. (2012, December). *Analyzing curriculum materials with preservice and mentor elementary teachers: Bridging science methods and field placement settings.* Invited presentation at the NARST Session at the annual National Science Teachers Association Regional Conference, Phoenix, AZ.

Gunckel, K. L. (2010, December). *A learning progression for water in socio-ecological systems*. Invited presentation, Pennsylvania State University, College of Education.

Gunckel, K. L. (2009, December). *Swirling discourses: Using a Discourses and communities framework to situate elementary preservice teachers' use of an instructional model to plan and teach science.* Paper invited for presentation at the NARST Session at the Annual National Science Teachers Association Regional Conference, Phoenix, AZ.

Conference Presentations (refereed)

Gunckel, K. L. (2022, April). *Teaching elementary school science to promote equity for the LBGTQIA+ Community*. In J. Thompson (Chair) Structured Poster Symposium on Equity in Elementary Science Teaching and Learning presented at the American Educational Research Association Annual Meeting, San Diego, CA.

Gunckel, K. L., Moreno, D., Tan, S., MacPherson, A., Dozier, S., Morell, L., & Wilson, M. (2022, March). *Examining the crosscutting concept of patterns: An initial construct map in the context of ecosystems*. Poster and paper presented at the International NARST Conference, Vancouver, Canada.

Wilson, M., Gunckel, K. L., Morell, L. (2021, June). *Learning progressions in science: Analyzing and deconstructing the multiple dimensions in assessment*. Presentation at the Annual DRK-12 PI Meeting, Washington D.C.

Covitt, B.A., Gunckel, K. L., Berkowitz, A., Moore, J.C. (2020, July). *Moving from literal to principle-based computational reasoning: A learning progression for integrating computational thinking with Earth and Environmental science instruction*. In S. Grover (Chair), Symposium on Integrating STEM and Computing in PK-12: Operationalizing Computational Thinking for

STEM Learning & Assessment. Symposium conducted at the meeting of the International Conference of the Learning Sciences, Nashville, TN. (Conference cancelled).

Gunckel, K.L., Moreno, D., Covitt, B, Caplan, B., Love, G., Cooper-Wagoner, J., Moore, J.C., Berkowitz, A. (2020, March). *Intertwining three dimensions: Levels of performance for computational thinking while using models of hydrologic systems*. Paper presented at the International NARST Conference, Portland, OR (conference cancelled, paper posted online at http://ibis-live1.nrel.colostate.edu/CompHydro/Products).

Moreno, D., Gunckel, K. L., Coates, M., Uber, C. (2019, November). *Teaching computational thinking using groundwater contamination*. Presentation at the Arizona Science Teachers Association conference, Phoenix, AZ.

Gunckel, K. L., (2019, October). *Expanding environmental science literacy to include cultural and community knowledge*. Paper presented at the Sustainable Development for the Americas Conference, Tucson, AZ.

Berkowitz, A., Caplan, B., Covitt, B., Gunckel, K.L., Love, G., Moore, J.C., Boone, R. B. (2019, August. *Empowering diverse students with scientific and conceptual thinking tools to address local water challenges*. Presentation at the Ecological Society of America Annual Meeting, Louisville, KY.

Gunckel, K. L. (2019). *Repairing Elementary School Science* American Education Research Association, Toronto, Canada.

Cooper-Wagoner, J. & Gunckel, K.L., (2019, March). *Teacher perspectives of the affordances and challenges of teaching computational thinking*. Paper presented at the International NARST Conference, Baltimore, MD.

Dykstra, E., & Gunckel, K. L., (2019, March). *Student and teacher identity: The influence of being an undergraduate teaching assistant in a biology laboratory course*. Paper presented at the International NARST Conference, Baltimore, MD.

Moreno, D. L., & Gunckel, K.L., (2019, March). Student empowerment in an environmental science literacy unit about groundwater contamination. Paper presented at the International NARST Conference, Baltimore, MD.

Berkowitz, A., Gunckel, K. L., Covitt, B.A., Podrosky, A., Moore, J. C., & Morrison, A., (2018, March). *Teachers' Experiences Integrating Data Sense-making and Computational Thinking into Science Instruction*. Paper presented at the International NARST Conference, Atlanta, GA.

Gunckel, K. L., Cooper-Wagoner, J., Covitt, B. A., Love, G., Boone, R., & Berkowitz, A., (2018, March). *Student ideas about computational thinking concepts when learning about modelling hydrologic systems*. Paper presented at the International NARST Conference, Atlanta, GA.

Moore, J.C., Gunckel, K. L., Covitt, B. A., & Berkowitz, A., (2018, March). *A systems thinking framework for integrating computational thinking and data sense-making into learning about hydrologic systems*. Paper presented at the International NARST Conference, Atlanta, GA.

Vezino, B., & Gunckel, K. L., (2018, March). *Preservice and mentor teachers co-learning to teach engineering in elementary classrooms*. Paper presented at the International NARST Conference, Atlanta, GA.

Gunckel, K. L., & Tolbert, S. E., (2017, April). Questioning the politics, ethics, and economics of the engineering education movement. In Tolbert (Chair), *Slowing Down the STEM Train*. Paper presented at the 97th Annual Meeting of the American Educational Research Association Meeting, San Antonio, TX.

Gunckel, K. L., (2016, April). *What does queer theory have to do with teaching science in elementary schools?* Paper presented at the 2016 Annual International Conference of the National Association of Research in Science Teaching, Baltimore, MD.

Canipe, M., & Gunckel, K. L. (2015, April). *Practical considerations: Elementary preservice teachers' uses of principle-based inquiry in planning and teaching science.* Paper presented at the 2015 Annual International Conference of the presented at the National Association of Research in Science Teaching, Chicago, IL.

Covitt, B.A., Gunckel, K. L., & Salinas, I. (2015, April). *Learning about surface water flow as a result of learning progression-based water instruction*. Paper presented at the 2015 Annual International Conference of the presented at the National Association of Research in Science Teaching, Chicago, IL.

Gunckel, K. L., Covitt, B. A., Cano, A., & Salinas, I. (2015, April). *Teacher pedagogical content knowledge for using learning progressions*. Paper presented at the 2015 Annual International Conference of the presented at the National Association of Research in Science Teaching, Chicago, IL.

Gunckel, K. L., Covitt, B.A., Salinas, I. (2014, April). *Teachers' uses of learning progression-based tools for reasoning in teaching about water in environmental systems*. Paper presented at the 2014 Annual International Conference of the National Association for Research in Science Teaching. Pittsburgh, PA.

Canipe, M. and K. L. Gunckel (2014, April*). Coming together: Preservice and mentor teachers' negotiation of meaning in joint spaces.* Paper presented at the 2014 Annual International Conference of the National Association for Research in Science Teaching. Pittsburgh, PA.

Wood, M. B. and K. L. Gunckel (2014, April). Celebrating not creating: Leveraging existing third spaces for teacher preparation. In W. Doyle (Chair), *Using Third Spaces in Teacher Education Design*. Paper presented at the 94th meeting of the American Educational Research Association. Philadelphia, PA.

Doyle, W., Gunckel, K. L., Wood, M. B., & Turner, E. E. (2013, September). *Blending pedagogical theory and practice in preservice science teacher education.* Paper presented at the 10th Biannual Conference of the European Science Education Research Association, Nicosia, Cyprus.

Gunckel, K. L., (2013, May). Teacher knowledge for using learning progressions in classroom instruction and assessment. In E. M. Furtak (Chair), *A critical appraisal of learning progressions in science: Exploring the intersection of science assessment, policy, & practice*. Paper presented at the 93rd Annual Meeting of the American Educational Research Association, San Francisco, CA.

Gunckel, K. L., & Wood, M. B., (2013, May). Characteristics of joint events for constructing third spaces. In W. Doyle (Chair), *Realizing third spaces in teacher education*. Paper presented at the 93rd Annual Meeting of the American Educational Research Association, San Francisco, CA.

Moore, J.C., Berkowitz, A. R., Gunckel, K. L., & Tschillard, R. (2013, February). *Learning progression-based teaching strategies for environmental science: Alignment of instructional goals with student outcomes*. Presentation at the NSF Math Science Partnership Learning Network Conference, Washington, D.C.

Gunckel, K. L., Covitt, B. A., & Anderson, C. W., (2012, June). *Reasoning tools for understanding water systems*. Presentation at the NSF Community for Advancing Discovery Research in Education (CADRE) DR-K12 Meeting, Washington, D.C.

Covitt, B. A., Anderson, C. W., & Gunckel, K. L. (2012, April). Ecological understandings as a basis for personal and public decision-making. In Lombardi, D. (Chair), *Teaching and learning for the environmental: Perspectives on Understandings, values, and action.* Paper presented at the 92nd Annual Meeting of the American Educational Research Association, Vancouver, British Columbia, Canada.

Doyle, W., Gunckel, K. L., Wood, M. B., & Turner, E. E., (2012, April). Mapping the discourses of practice. In W. Doyle (Chair), *Understanding and supporting teaching practice: Multiple perspectives*. Paper presented at the 92nd Annual Meeting of the American Educational Research Association, Vancouver, British Columbia, Canada.

Anderson, C. W., Doherty, J., Gunckel, K. L., Hartley, L., Schramm, J., & Covitt, B. A., (2012, April). Using learning progression frameworks and assessments to guide research and professional development. In Sevian, H. (Chair), *K-12 student success: Complexity in mathematics and science education research*. Paper presented at the 92nd Annual Meeting of the American Educational Research Association, Vancouver, British Columbia, Canada.

Gunckel, K. L., (2012, March). *Curriculum materials analysis as a boundary spanning task: Bridging science methods and field placement discourses.* Paper presented at the 2012 Annual International Conference of the National Association for Research in Science Teaching, Indianapolis, IN.

Covitt, B.A. & Gunckel, K. L., (2012, March). *Using a water systems learning progression to design and test formative assessments and tools for reasoning.* Paper presented at the 2012 Annual International Conference of the National Association for Research in Science Teaching, Indianapolis, IN.

Stokes, P. J., Levine, R., Fuhrman, M., Gunckel, K. L., & Flessa, K. W. (2011, October). *Troubleshooting the pipeline: Developing a critical incident taxonomy for minority and non-minority student pathways into the geosciences.* Paper presented at the 2011 Annual Meeting of the Geological Society of America, Minneapolis, MN.

Covitt, B. A., Gunckel, K. L., & Anderson, C. W. (2011, September). *Reasoning tools for understanding water systems.* Presentation at the Sustaining the Blue Planet Global Water Education Conference, Bozeman, MT.

Gunckel, K. L., Covitt, B. A., & Shuttlefield, J. (2011, August). *Developing a learning progression for water in socio-ecological systems*. Presentation at the 96th Annual Meeting of the Ecological Society of America, Austin, TX.

Gunckel, K. L., Wood, M. B., Turner, E. E., & Dykstra, E. (2011, April) S*econdary teachers' beliefs about experiences connecting the school mathematics and science curriculum to the "real world"*. Paper presented at the 91st Annual Meeting of the American Educational Research Association 2011, New Orleans, LA.

Covitt, B. A., Gunckel, K. L., & Anderson, C. W. (2010, April). *A Learning progression for understanding water in socio-ecological systems.* Poster presented at the 91st Annual Meeting of the American Educational Research Association, Denver, CO.

Gunckel, K. L., Covitt, B. A., & Anderson, C. W. (2010, March). *Teacher responses to assessments of understanding of water in socio-ecological systems: A learning progressions approach*. Paper presented at the 2010 Annual International Conference of the National Association for Research in Science Teaching, Philadelphia, PA.

Anderson, C. W., Gunckel, K. L., Covitt, B. A., Mohan, L., & Jin, H. (2010, March). *Learning progressions for environmental science literacy*. In T. Phillipson-Mower (Chair), The intersection of research in science education and environmental education. Presentation at

the 2010 Annual International Conference of the National Association for Research in Science Teaching, Philadelphia, PA.

Gunckel, K. L., Covitt, B. A., & Anderson, C. W. (2009, June). *Learning a secondary Discourse: Shifts from force-dynamic to model-based reasoning in understanding water in socio-ecological systems.* Paper presented at the Learning Progressions in Science (LeaPS) Conference, Iowa City, IA.

Gunckel, K. L., Covitt, B. A., Dionese, T., Dudek, R., & Anderson, C. W. (2009, April). *Developing a learning progression for student understanding of water in environmental systems.* Paper presented at the 2009 Annual International Conference of the National Association for Research in Science Teaching, Garden Grove, CA.

Gunckel, K. L. (2009, April). *Swirling discourses: Using a discourses and communities framework to situate elementary preservice teachers' use of an instructional model to plan and teach science.* Paper presented at the 2009 Annual International Conference of the National Association for Research in Science Teaching, Garden Grove, CA.

Gunckel, K. L. (2008, April). *Preservice elementary teachers learning to use science curriculum materials*. Paper presented at the 2008 Annual International Conference of the National Association for Research in Science Teaching, Baltimore, MD.

Gunckel, K. L., Covitt, B. A., Abdel-Kareen, H., Dudek, R., & Anderson, C. W. (2008, April). *A learning progression for processes that move water through socio-ecological systems*. Paper presented at the 2008 Annual International Conference of the National Association for Research in Science Teaching, Baltimore, MD.

Covitt, B., Gunckel, K. L., Abdel-Kareen, H., Dudek, R., & Anderson, C. W. (2008, April). *A learning progression for processes that alter water quality in socio-ecological systems*. Paper presented at the 2008 Annual International Conference of the National Association for Research in Science Teaching, Baltimore, MD.

Cartier, J., Gunckel, K. L., Schwarz, C. V., Smith, E. L., Sink, W., Kannan, P., et al. (2008, March). *Examining elementary science curriculum materials through the lens of instructional frameworks: Supporting pre-service teacher learning*. Paper presented at 88th Annual Meeting of the American Educational Research Association, New York, NY.

Gunckel, K. L., Bae, M.-J., & Smith, E. L. (2007, April). *Using instructional models to promote effective use of curriculum materials among preservice elementary teachers.* Paper presented at the 2007 Annual International Conference of the National Association for Research in Science Teaching, New Orleans, LA.

Gunckel, K. L., Smith, E.L., & Schwarz, C.V. (2007, January). *The Inquiry-application model for analyzing and modifying curriculum materials*. Presentation at the annual meeting of the 2012 International Meeting of the Association for Science Teacher Education, Clearwater Beach, FL.

Covitt, B. A., & Gunckel, K. L. (2006, October). *A K-12 learning progression to support understanding of water in the environment*. Presentation at the 35th Annual Meeting of the North American Association of Environmental Education, St. Paul, MN.

Gunckel, K. L. & Vandenbelt, D. (2006, April). *Curriculum in the classroom: The function of curriculum materials in planning & teaching in a high school science course*. Poster presented at the 2006 Annual International Conference of the National Association for Research in Science Teaching, San Francisco, CA.

Smith, E. L., Gunckel, K. L., & Schwarz, C. V. (2006, April). *Enabling elementary teachers to evaluate and modify science curriculum materials: Conceptual framework for the elementary teachers and curriculum materials projec*t. Paper presented at the 2006 Annual International Conference of the National Association for Research in Science Teaching, San Francisco, CA.

Gunckel, K. L. (2006, April). *Water for people and the planet: A high school curriculum unit on water systems*. Presentation at the Geological Society of America North Central Section Conference, Akron, OH.

Gunckel, K. L., & Tsurusaki, B. K. (2006, January). *Challenges in teaching about curriculum materials to preservice elementary teachers*. Presentation at the 2006 International Conference of the Association for Science Teacher Education, Portland, OR.

Gunckel, K. L. & Moore, F. (2005, April). *Including students and teachers in the co-design of the enacted curriculum*. Paper presented at the 2005 Annual International Conference of the National Association for Research in Science Teaching, Dallas, TX.

Gunckel, K. L., Fortus, D., & Smith, E. (2005, January). *Exploration of the role of curriculum materials in teaching science and learning to teach science*. Presentation at the 2005 International Conference of the Association for Science Teacher Education, Colorado Springs, Colorado.

Gunckel, K. L. (2004, April). *The Nature of science in curriculum materials*. Paper presented at the 2004 Annual International Conference of the National Association for Research in Science Teaching, Vancouver, B.C.

Smith, E. L., Gunckel, K. L., Fortus, D., Krajcik, J., & Roseman, J. (2004, January). *Curricula in the classroom: Modules for preparing teachers to evaluate and modify curriculum materials*. Presentation at the 2004 International Conference of the Association for Science Teacher Education, Nashville, TN.

Gunckel, K. L., Haskell, H., Dwyer, M., & Doyle, J. (1998). *Ecosystem explorations: A museum/school/community collaboration*. Presentation at the 1998 National Science Teachers Association Southwest Regional Conference, Albuquerque, NM.

Gunckel, K. L., Haskell, H., Dwyer, M., & Doyle, J. (1998). *Environmental education for the novice and pre-service teacher*. Presentation at the 1998 Annual Meeting of the Environmental Education Association of New Mexico Annual Conference, Las Cruces, New Mexico.

Gunckel, K. L., Haskell, H., Dwyer, M., & Doyle, J. (1998). *Natural sciences and the ecology field program*. Presentation at the 1998 Annual Meeting of the Environmental Education Association of New Mexico Annual Conference, Las Cruces, New Mexico.

Gunckel, K. L., Peknick, C., & Doyle, J. (1997). *Ecosystem explorations: Connections between ecosystems and the classroom*. Presentation at the 1997 Annual Meeting of the Environmental Education Association of New Mexico Annual Conference, Taos, New Mexico.

Gunckel, K. L. & Peknick, C. (1997). *Easy strategies for teaching outside*. Presentation at the 1997 Annual Meeting of the New Mexico Science Teachers Association State Conference, Albuquerque, New Mexico.

Gunckel, K. L. (1992, May). *5th- and 6th-grade students participating in geological research: A model for earth science and research education*. Presentation at the Geological Society of America Western Section Conference, Eugene, Oregon.

Gunckel, K. L. (1990, May). *The McCartney Mountain intrusion: A christmas-tree laccolith in the S.W. Montana fold-and-thrust belt*. Presentation at the Geological Society of America Rocky Mountain Section Conference, Jackson Hole, Wyoming.

GRANTS and CONTRACTS

Federal

2020-2024 *Learning Progressions in Science: Analyzing and Deconstructing the Multiple Dimensions in Assessment*, National Science Foundation DRK-12, Co-PI 16% effort. PI Mark Wilson, University of California, Berkeley (Total Award $1,463,930). Project to build three-dimensional assessments and learning progressions across Earth, physical and life sciences, argumentation, and patterns.

2015-2020 *Comp Hydro: Integrating Data Computation and Visualization to Build Model-Based Water Literac*y, National Science Foundation, STEM+C, Co-PI 12% effort. PI John Moore, Colorado State University (Total Award, $2,199,999.00). Project to build learning progressions for the integration of computational thinking into model-based reasoning about water in environmental systems.

2010 - 2014 *Beyond Bridging: Co-Education of Preservice and Inservice Elementary Teachers in Science and Mathematics*, National Science Foundation, DRK-12, Senior Researcher, 12% effort. PI Bruce Johnson, University of Arizona (Total Award, $2,223,107). Project to support preservice and inservice elementary teachers in enacting inquiry-oriented science and problem-based mathematics instruction.

2010 - 2013 *Tools for Reasoning for Understanding Water Systems, National Science Foundation*, DRK-12. Co-PI 16% effort. PI Beth Covitt, University of Montana (Total Award, $486,082). Exploratory project to develop instructional tools and formative assessments for supporting students in constructing model-based explanations and predictions when tracing water and substances in water through environmental systems.

2008 - 2015 *Culturally Relevant Ecology, Learning Progressions and Environmental Literacy*, National Science Foundation Targeted Math Science Partnership. Senior Researcher, 10% effort. Principal Investigator John Moore, Colorado State University. (Total Award, $12,768,898). Multi-institution project to develop culturally-relevant, place-based teacher professional development, classroom curriculum materials, and learning progressions to support students in becoming environmentally science literate.

Private Foundation

2008 – 2011 *Mathematics and Science Teacher Education/Retention – Industry Partners (MASTER-IP)*, Science Foundation Arizona, Co-PI, 5% effort, PI Bruce Johnson, University of Arizona (Total Award, $1,500,000). Project to provide early career secondary science teachers with science or mathematics industry work experience and a masters degree in education.

University/College

2016 *Arizona Indigenous Communities, Environment, Education, and Science,* 100% Engagement Project, Office of Student Engagement, University of Arizona. PI

Kristin Gunckel, University of Arizona (Total Award, $20,000). Funding for a field learning experience for 15 undergraduate students to learn about the cultural perspectives of Hopi and Dine people on three environmental and educational issues.

2010 *Developing a Learning Progression for Student Understanding of Water in Environmental Systems,* Smith Junior Faculty Award, College of Education, University of Arizona, PI Kristin Gunckel (Total Award, $4,651). Funding for a graduate research associate to assist with the development of the Water Systems Learning Progression.

2010 *Secondary Teachers' Understandings and Emerging Practices Related to Relevant, Authentic, and "Real-World" Science and Mathematics,* Smith Junior Faculty Award, College of Education, University of Arizona, PI Kristin Gunckel (Total Award, $4,951) Funding for a graduate research associate to assist research to explore teachers' conceptions and use of the "real world" in teaching.

SERVICE and OUTREACH

Local/ State Service/Outreach

2016-2018 *Comp Hydro* professional development, Sunnyside High School & Desert View High School, Sunnyside Unified School District

2017 *School Gardens and Science* professional development, Heritage Grants, Sam Hughes Elementary School, Tucson Unified School District.

2016 Science teacher professional development, Walker Elementary, Amphitheatre Public Schools

2010-2013 Beyond Bridging *S*cience Teaching Professional Development for Elementary Teachers, Tucson Unified School District

2011-2015 Science Fair Judge, various schools, Tucson, AZ

2008-2012 Education Advisory Committee, Cooper Center for Environmental Learning, Tucson, Arizona

2012 *S*cience teaching professional development for Sabino Canyon Volunteer Naturalists, Coronado National Forest, Tucson, Arizona

2011 Learning Progressions professional development for the Arizona Project WET Advanced Workshop, Water Resources Research Center (University of Arizona)

2006, 2007 Earth Science professional development workshops, Promoting Rigorous Outcomes in Mathematics and Science Education (PROM/SE). Michigan State University

1998, 1999 *Tools for the Non-Formal Educator*, professional development workshop for the Environmental Education Association of New Mexico. Albuquerque, New Mexico

1997 - 1999 *Ecosystem Explorations* curriculum professional development. New Mexico Museum of Natural History and Science. Albuquerque, New Mexico

1997 - 1999 Board Member, Environmental Education Association of New Mexico

National Service/Outreach

2018-2021 Editorial Board Member, *Journal of Research in Science Teaching*

2020	Advisory Board Member, GEOCODE, Concord Consortium, Concord MA, Amy Pallant, PI (NSF STEM+C)
2017 -2018	Advisory Board Member, Teaching Environmental Sustainability with Model My Watershed, Stroud Water Research Center, Avondale, PA , Steve Kerlin, PI (NSF DRK12).
2017 - 2018	Advisory Board Member, Geological Models for Explorations of Dynamic Earth (GEODE), Pennsylvania State University, Scott McDonald, PI (NSF DRK12)
2016	National advisory committee member and item developer, Elementary Education Multiple Subject Exam: Content Knowledge for Teaching Science, Educational Testing Service, Princeton, NJ.
2016, 2021	Panel member to review grant proposals, National Science Foundation
2016	Advisory Board Member, Learning Progressions in Place and Geography, Kansas State University, Thomas Larson & John A. Harrington, Co-PIs (NSF)
2015	Advisory board member, Model My Watershed, Stroud Water Research Center, Avondale, PA (NSF DRK12), Susan Gill, PI
2014, 2015 2017, 2018, 2020, 2021	External Tenure Reviewer
2013	*NGSS Crosscutting Concepts: Patterns*. Online seminar as part of the *Next Generation Science Standards* Web Seminar Series, National Science Teachers Association
2013	Invited participant, Science & Geography Learning Forum, Teachers College, Columbia University
2012 - 2014	Advisory board member, Modeling Hydrologic Systems in Elementary Science, University of Iowa, (NSF DRK12), Cory Forbes, PI
2010 - 2014	Advisory board member, Targeted Math Science Partnership in Earth & Space Science Education, Pennsylvania State University (NSF MSP), Scott McDonald, PI
2009 - 2011	Program committee and strand leader (Strand 7 Preservice Teachers), NARST (A Worldwide Organization for Improving Science Teaching and Learning through Research)
2006 – Present	Reviewer

Conferences
- American Educational Research Association
- NARST (A Worldwide Organization for Improving Science Teaching and Learning through Research)

Peer-Reviewed Journals
- *International Journal of Science Education (1)*
- *Measurement: Interdisciplinary Research and Perspectives*
- *Multicultural Perspectives*
- *Journal of Instructional Science*
- *Journal of LGBT Youth*
- *Journal of Literacy Research*
- *Journal of Research in Science Teaching (9)*
- *Journal of Science Teacher Education*

Journal of Science Education & Technology
*Journal of Teacher Education**
Science Education (4)
Teaching & Teacher Education (3)
Waters

(#) Indicates Number of Reviewer in 2021

National Science Teachers Association Press (Book)

Bristol Book Review for publication

Chapter Reviewer, Learning Progressions in Science (Alonzo & Gotwals, Eds)

Chapter Reviewer, Handbook of Learning Progressions (Jin, Yan, Krajcik, Eds)

2002	Regional Convention Program Committee Member, National Science Teachers Association

Departmental Service

2021	Chair, Science Education Lecturer Search Committee
2020	Chair, Science Education Assistant Professor Search Committee
2018- 2020	Chair, TLS Doctoral Degree Task Force, Teaching, Learning, & Sociocultural Studies
2015-Present	Graduate Curriculum Committee, Teaching, Learning, & Sociocultural Studies (Chair 2015-2021)
2015 - 2017	Annual Review Committee, Teaching, Learning, & Sociocultural Studies
2015 - Present	Elementary Teacher Preparation Program Redesign Committee
2016	Associate Professor Search Committee, Teaching, Learning, & Sociocultural Studies
2008 - Present	Elementary Science Methods coordinator and mentor for new instructors
2014	Annual Review Committee, Teaching & Teacher Education
2010 - 2014	Teaching & Teacher Education Graduate Curriculum Committee
2008, 2014	Teacher in Residence Selection Committee
2010, 2012, 2013, 2017	Discussant, Teaching Learning, Sociocultural Studies Graduate Student Colloquy
2011	Science Education Assistant Professor Search Committee
2008 - 2009	Teaching & Teacher Education Undergraduate Program Committee

College Service

2021	Director STEM Learning Center Search Committee
2020	Organizer, Zoom with a Wildcat – Online interactive activity sessions for schools, teachers, and parents during COVID 19 school closures.
2018	Trans* Scholar in Education Search Committee

2010 - 2011	Ad Hoc Safe Schools Committee, University of Arizona. This group addresses LGBTAQ issues in the College of Education.
2008 - 2010	College of Education Awards Committee, University of Arizona
2005 - 2008	Co-Leader, GLBT Safe Schools Program, College of Education, Michigan State University

University Service

2009 - Present	Affiliated faculty with the Institute for LGBT Studies, University of Arizona
2017, 2018	Staff Awards for Excellence Judge, University of Arizona
2015	University Strategic Planning Workshop: Water, Energy & the Environment
2013	Curriculum Inclusion Working Group, LGBTQA Strategic Planning Group. This is a group convened by the UA LGBTQA Affairs Office to address LGBTQA issues campus-wide
2013	Workshop on the *Framework for K-12 Science Education* and the *Next Generation Science Standards*, University of Arizona STEM Learning Center
2013	Teacher Recruitment, Preparation, Retention and Professional Development working group, University of Arizona STEM Learning Center

Professional Memberships

American Educational Research Association (AERA)

Arizona Science Teachers Association (ASTA)

Association of Science Teacher Educators (ASTE)

NARST (A Worldwide Organization for Improving Science Teaching and Learning through Research)

National Science Teachers Association (NSTA)
