# Curriculum Vitae

**Steven L. Shumway**

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### EDUCATION

Ph.D., Utah State University, Education- Curriculum and Instruction (1999)

M.S., Utah State University, Industrial Technology and Education (1993)

 B.S., Brigham Young University, Industrial Education (1987)

### PROFESSIONAL POSITIONS

Professor, Brigham Young University (2016 - present): Technology and Engineering Education Program, School of Technology, Fulton College of Engineering and Technology

Associate Professor, Brigham Young University (2006 - 2016): Technology and Engineering Education Program, School of Technology, Fulton College of Engineering and Technology

Assistant Professor, Brigham Young University (1999 - 2006): Technology and Engineering Education Program, School of Technology, Fulton College of Engineering and Technology

Instructor, Brigham Young University (1993 - 1999): Technology Teacher Education Program, School of Technology, College of Engineering and Technology

Instructor (Electronics/Technology), Hillcrest High School – Jordan School District, Midvale, UT (1987 - 1993)

### PROFESSIONAL MEMBERSHIPS

 International Technology and Engineering Educators Association (ITEEA)

 Council on Technology and Engineering Teacher Education (CTETE)

 Association for Career and Technical Education (ACTE)

 Utah Association for Career and Technical Education (UACTE)

 Utah Technology and Engineering Educators (UTEE)

 National Science Teachers Association (NSTA)

### PEER-REVIEWED JOURNAL ARTICLES

Bell, M., Shumway, S., & Wright, G. (2020). An Investigation of the Impact of a Flipped Classroom Instructional Approach on High School Students’ Content Knowledge and Attitude Toward the Learning Environment. *Advances in Social Sciences Research Journal*, *7*(5), 338-349

<https://journals.scholarpublishing.org/index.php/ASSRJ/article/view/8259>

Rich, P., Jones, E., Shumway, S., Miner, A., Anderson, N., (Under Review) Elementary School Engineering: Measuring Teachers’ Beliefs and Self-Efficacy in Elementary Engineering (BSEEE-T), *Journal of Engineering Education*. American Society for Engineering Education

Bartholomew, S., Mahoney, M., Warner, S., Lecorchick, D., Shumway, S. (2020). Our Curriculum: What Exactly do We Teach in TEE?, *Technology and Engineering Teacher*, International Technology and Engineering Education Association, Reston, VA. 79 (5), 1-8

Rytting, M., Wright, G., Shumway, S., Jensen, J. (2019). Comparison of Simulation and Hands-on Labs in Helping High School Students Learn Physics Concepts, *International Journal of Education*, Macrothink Institute, Las Vegas, Nevada

Wright, G., Shumway, S. (2018). Engineering attitudes: an investigation of the effect of literature on student attitudes toward engineering, *International Journal of Technology and Design Education*, (July), 1-13.

Barth, K., Bahr, D., Shumway, S. (2017). Generating clean water: A method for integrating science and engineering instruction. *Science and Children Journal*, NSTA (National Science Teachers Association), 55 (4), 3-9.

Rose, M.A., Carter, V., Brown, J., Shumway, S. (2017). Status of elementary teacher development: Preparing elementary teachers to deliver technology and engineering experiences. *Journal of Technology Education*, 28 (2), 2-18

Siebert, D, Draper, R. J., Grierson, S., Barney, D., Broomhead, P., Jensen, A. P., Nokes, J. D., Shumway, S., & Wimmer, J. J. (2016). Characteristics of Literacy Instruction that Supports Reform in Content-area Classrooms. *Journal of Adolescent & Adult Literacy,* 60 (1). 25-33.

Rose, M.A., Shumway, S., Carter, V., Brown, J. (2015). Identifying Characteristics of Technology and Engineering Teachers Striving for Excellence Using a Modified Delphi. *Journal of Technology Education*, 26 (2), 2-21.

Bartholomew, S., Wright, G.A., Shumway, S.L., Terry, R.E. (2012). Analysis of five instructional methods for teaching Sketchpad to junior high students. *Journal of Technology Education*, 24 (1). 54-72.

Draper, R.J., Adair, M., Broomhead, P., Gray, S., Grierson, S., Hendrickson, S., Jensen, A., Nokes, J., Shumway, S., Siebert, D., Wright, G. (2011). Seeking renewal, finding community: Participatory action research in teacher education, *Teacher Development,* 15 (1), 1-18. Routledge Journals: Abingdon, Oxfordshire, UK.

Shumway, S.L. (2008). Design Activity: Students designing their own video games. *Technology & Children*, 12 (3), 12-13.

Erekson, T.L, & Shumway, S.L. (2006). Integrating the study of technology into the curriculum: A consulting teacher model. *Journal of Technology Education*, 18 (1). 27-38.

Shumway, S. (2005). Science and technology working together. *Technology & Children*, 9 (3), 4-5.

Shumway, S. & Berrett, J. (2004). Standards-based curriculum development for pre-service and in-service: A “partnering” approach using modified backwards design. *The Technology Teacher*, 64 (3). 26-29.

Shumway, S. & Berrett, J. (2004). Resources: Rocketry and math connections. *Technology & Children*, 9 (1), 14-15.

Erekson, T. & Shumway, S., (2002). Technology education as college prep. *The Technology Teacher*, 61 (6), 10-15.

Shumway, S., Saunders, W., Stewardson, G. & Reeve, E. (2001). A comparison of classroom interpersonal goal structures and their effect on group problem-solving performance and students’ attitudes toward their learning environment, *Journal of Industrial Teacher Education*, 38 (3), 6-24.

Shumway, S. (1996). Students Learn Computer Interfacing at BYU Tech Lab. *Utah Industrial Education Association Journal*, 37(3), 6-8.

**CHAPTERS IN YEARBOOKS/BOOKS**

Shumway, S & Wright, G. (2010). (Re)Imagining Literacies for Technology Classrooms. In R.J. Draper (Ed). *(Re)Imagining Content-Area Literacy Instruction,* (Chapter 6). New York: Teacher College Press-Columbia University.

Shumway, S. & Berrett, J. (March, 2007). Applying classroom assessment data: communicating results and modifying instruction. In M. Hoepfl and M. R. Lindstrom (Eds.) *Assessment in Technology Education: 56th yearbook of the council on technology teacher education,* (Chapter 7). New York: Glencoe McGraw-Hill.

Shumway, S. (2006). A collection of best practice vignettes for Technology Education: Standards-Based Curriculum, Monthly Support Services, A Periodic Break from Modules, Just-In-Time Instruction, Structuring Individual Accountability, Structuring Activities for Intrinsic Motivation, Practicum in Standards-Based Curriculum Development. In G.E. Martin and C. Martin (Eds.) *Best Practices in Technology Education: A Collection of 21st Century Best Practices in Technology Education*, Published by the Technical Foundation of America. Glen Ellen, IL.

Reeve, E. & Shumway, S. (2003). Cooperative learning in technology education. In K.R Helgeson and A.E. Schwaller (Eds.) *Selecting Instructional Strategies for Technology Education: 52nd yearbook of the council on technology teacher education,* (Chapter 9). New York: Glencoe McGraw-Hill.

**PUBLISHED CONFERENCE PAPERS**

Rose, A., Carter, V., Brown, J., Shumway, S. (2016) Preparing teachers to deliver technology and engineering experiences. Session II: Does the Rhetoric Emulate Reality? 103rd Mississippi Valley Technology Teacher Education Conference. Rosemont, IL. November 10.

Bonsignore, E., Hansen, H., Pellicone, A., Ahn, J., Kraus, K., Shumway, S., Kaczmarek, K., Parkin, J., Cardon, J., Sheets, J., Koepfler, J., Holl-Jensen, C. (2016). Traversing Transmedia Together: Co-designing an Educational Alternate Reality Game For Teens, With Teens. In *Proceedings for ACM SIGCHI Interaction Design and Children (IDC' 16),* ACM.

Wright, G., Shumway, S., Vargas, C., and Terry, R. (2015). Development, of an engineering and technology curriculum for Dominican Republic 6-12th graders, *Proceedings of the Latin American and Caribbean Consortium of Engineering Institutions (LAECCI) XIII International Conference on Engineering and Technologies*, Santo Domingo, Dominican Republic. July.

Wright, G., Shumway, S., Vargas, C., and Terry, R. (2015). Scaffolding to improve understanding of engineering and technology in the Dominican Republic, *Proceedings of the Latin American and Caribbean Consortium of Engineering Institutions (LAECCI) XIII International Conference on Engineering and Technologies*, Santo Domingo, Dominican Republic. July.

Wright, G., Shumway, S., Vargas, C., and Terry, R. (2015). The development, implementation, and evaluation of teaching engineering curriculum to Dominican Republic junior high and high school students, *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, Seattle, Washington. June.

Jackson, J., Jackson, A., & Shumway, S. (2015). High school sound recording curriculum utilizing the iPad. In *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 2876-2881). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Wright, G., Shumway, S., and Terry, R. (2013). The teaching and evaluation of technology and engineering concepts to Dominican junior high and high school students, *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, Atlanta, Georgia, June.

Wilding, W.V., Archibald, J.K., Jensen, B.D., Richards, P., Shumway, S.L. (2012). Fostering excellence in teaching and learning in a college of engineering. *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, San Antonio, TX, June.

Shumway, S., Terry, R.,Vargas, C., Wright, G. (2011). A study abroad in the Dominican Republic: Mentoring university students as they prepare and teach 6-12 grade students technology and engineering concepts, *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, Vancouver, Canada, June.

Shumway, S., Vargas, C., Wright, G., and Terry, R., (2010). A collaboration effort to teach technology and engineering concepts to middle school and high school students in the Dominican Republic, *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, Louisville, Kentucky, June.

Cook, K., Wright, G., Shumway, S., Terry, R.E., (2009). An investigation of middle school student interest, perception, and attitude toward technology and engineering, *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, Austin, Texas, June.

Terry, R., Shumway, S., Erekson, T., Swapp, A. & Berrett, J. (2007). A successful professional development activity to infuse engineering content for Utah 9-12 teachers. *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, Honolulu, HI. June.

Erekson, T. L., & Shumway, S. L.  (2004).  Technology teacher education in colleges of engineering:  A strategic link between engineering technology and K-12 school, *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, Salt Lake City, UT. June.

**CONFERENCE PRESENTATIONS**

Note: These are presentations in which an abstract to present is submitted to the conference selection committee and then a blind review process is used to select presentations based on merit of the abstract. No published proceedings.

Shumway, S. (2020), *Engaging Students in the Engineering Design Process: Designing a Safety Helmet.* Presented at the Utah Association for Career and Technical Education Mid-Winter Conference, Riverton High School, Jan. 31-Feb.1.

Shumway, S. (2019), *Engineering and Community Partnerships*. ASEE Session: Presented at the National Science Teaching Association (NSTA) Area Conference on Science Education., Salt Lake City, UT. Oct. 24-26

Bartholomew, S., Mahoney, M., Warner, S., Lecorchick, D., Shumway, S. (2019), *Our Curriculum: What Exactly do We Teach in TEE?*, Council on Technology and Engineering Teacher Education (CTETE) Session. Presented at the International Technology and Engineering Educators (ITEEA) Annual Conference, Kansas City, KS. March.

Shumway, S., Chamberlin, A. (2018). *Designing and programming a catapult system using Arduino microcontrollers*. Utah State Board of Education, Technology and Engineering Education Summer Conference, Skyridge High School, June 12.

Shumway, S., Obrien, S. & Love, T. (2018). *Integrating computer programming: Approaches, outcomes and resources*. Council on Technology and Engineering Teacher Education (CTETE) Session. Presented at the International Technology and Engineering Educators (ITEEA) Annual Conference, Atlanta, GA. April.

Rose, A., Carter, V., Brown, J, Shumway, S. (2016). *Status of Elementary Teacher Development: Preparing Elementary Teachers for Technology and Engineering Experiences*, Council on Technology and Engineering Teacher Education (CTETE) Session. Presented at the International Technology and Engineering Educators (ITEEA) Annual Conference, Washington, D.C. March.

Shumway, S. (2015). *Mechanical engineering activities for the middle school*. Utah State Office of Education Summer Conference for Technology & Engineering Teachers: American Fork Middle School, American Fork, Utah, June 16-18.

Shumway, S. (2014). *Physics of the Caribbean: Integrating science and math with engineering design.* Utah State Office of Education Summer Conference for Technology & Engineering Teachers: Davis High School, Farmington, Utah, June 9-10.

Shumway, S., Rose, A., Carter, V., Brown, J. (2014). *Characteristics of technology and engineering teachers striving for excellence – A Delphi study*. Council on Technology and Engineering Teacher Education (CTETE) Session. Presented at the International Technology and Engineering Educators (ITEEA) Annual Conference, Orlando Florida, March.

Draper, R. J., Grierson, S., Siebert, D., Barney, D., Broomhead, P., Jensen, A. P., Nokes, J. D., Shumway, S., & Wimmer, J. J. (2013). *Problematizing informational text identification and promoting a reader-stance focus to reading in the disciplines.* Dallas, TX: Annual meeting of the Literacy Research Association.

Grierson, S., Draper, R. J., Barney, D., Broomhead, P., Jensen, A. P., Nokes, J. D., Shumway, S., & Wimmer, J. J. (2012). *Disciplinary texts and literacies in K-12 classrooms*. Las Vegas, NV: Post-convention presentation given at the annual meeting of the National Council of Teachers of English.

Draper, R. J., Grierson, S., Siebert, D., Barney, D., Broomhead, P., Jensen, A. P., Nokes, J. D., Shumway, S., & Wimmer, J. J. (2012). *Reimaginiing the preparation of teachers to support students’ acquisition and learning of disciplinary literacies*: Annual Meeting of the Literacy Research Association (LRA), San Diego, CA.

Shumway, S., Bates, D., Shumway, T. (2011). *Walk-along gliders: Teaching students principles of flight.* Utah State Office of Education Summer Conference for Technology & Engineering Teachers: Orem High School, Orem, Utah, June 15-16.

Draper, R. J., Jensen, A., Broomhead, P., Nokes, J., Siebert, D., Grierson, S., Hendrickson, S., Wright, G., Gray, S., & Shumway, S. (2009). *Seeking renewal, finding community: Participatory action research in teacher education*: Literacy Study Group, Brigham Young University, American Educational Research Association Conference (AERA), San Diego, CA, April 13-17.

Shumway, S., Wheeler, D. (2008). *Exploring the engineering design process*. Utah State Office of Education Summer Conference for Technology & Engineering Teachers: Northridge High School, Layton, Utah, June 12-13.

Shumway, S., Brown, R., Massic, J., Merrill, J. & Shumway, T. (2008). *Video game design for beginners*. Utah State Office of Education Summer Conference for Technology & Engineering Teachers: Northridge High School, Layton, Utah, June 12-13.

Draper, R. J., Jensen, A., Broomhead, P., Nokes, J., Siebert, D., Grierson, S., Hendrickson, S., Asay, D., Shumway, S. (2008). *Applying the multiliteracies pedagogical framework to content area teaching:* Literacy Study Group, Brigham Young University, National Reading Conference (NRC), Orlando, FL.

Shumway, S. (2006). *Applying the engineering problem-solving matrix to a high school engineering activity.* Wisconsin Technology Education Conference. University of Wisconsin-Stout, Menomonie, WI.

Shumway, S. (2005). *High school students working in engineering groups: Structuring individual accountability*. Annual American Society for Engineering Education, Rocky Mountain Section Conference. Utah State University, Logan, UT.

Erekson, T. L., & Shumway, S. L.  (2004).  Technology teacher education in colleges of engineering:  A strategic link between engineering technology and K-12 school, *Proceedings of the American Society for Engineering Education (ASEE) Annual Conference*, Salt Lake City, UT. June.

Shumway, S. & Merrill, C. (2004). *Teacher educator models for implementing Standards for Technological Literacy (STL) and Advancing Excellence in Technological Literacy (AETL) into Teacher Preparation Programs.* 66th Annual International Technology Education Association Conference, Albuquerque, New Mexico.

Shumway, S. (2003). *Utah Education Network (UEN) lesson plans and connecting to the national standards for technological literacy*. Utah State Office of Education Summer Conference for Technology Education Teachers: West Jordan High School, West Jordan, Utah, June 16-17.

Shumway, S. (2003). *Lesson planning with the national standards.* Utah State Office of Education Summer Conference for Technology Education Teachers: West Jordan High School, West Jordan, Utah, June 16-17.

Daugherty, M., Barnett, E. & Shumway, S. (2003). *Implementation of all four sets of standards for teacher educators, professional development trainers, state and local supervisors, and vendors.* 65th Annual International Technology Education Association Conference, Nashville, Tennessee.

Erekson, T., & Shumway, S. (2002). *Technology education as college prep.* 64th Annual International Technology Education Association Conference, Columbus, Ohio.

Shumway, S., & Barnett, E., (2002). *A state model for implementing the Standards for Technological Literacy (STL)*. 64th Annual International Technology Education Association Conference, Columbus, Ohio.

Shumway, S. (2001). *Development of a high school pre-engineering course in the State of Utah.* Utah State Office of Education, Technology Education Conference at West Jordan High School, West Jordan, Utah.

Shumway, S. (2001). *Simple automation using the BASIC Stamp microcontroller*. Colorado Technology Education Association’s 16th Annual Rocky Mountain States Conference; November 9-10, Ft. Collins, CO.

Shumway, S. (2001). *Cooperative group activities: Research and implementation.* 63rd Annual International Technology Education Association Conference, Atlanta, Georgia.

Shumway, S. (1999). *Some things to consider when involving students in group problem-solving activities: The results of research*. Presented at the XXXV annual Mountain States Technology Conference, Alta Utah.

Shumway, S. (1998). *Motivating students in technology education: A powerful tool for teaching.*  Presented at the XXXIV annual Mountain States Technology Conference, Alta Utah.

Shumway, S. (1996). *An integrative review of literature comparing male and female middle school students’ concepts of and attitude toward technology*. Presented at the annual International Technology Education Association Conference, Phoenix, Arizona.

Shumway, S. & Boswell, B. (1994). *Teaching problem solving using computer interfacing activities*. Presented at the annual Utah Technology Education Conference, Northridge High School, Layton Utah.

**INVITED PROFESSIONAL PRESENTATIONS**

Shumway, S. (2019). *Engineering Activities for the new College and Career Awareness (CCA) standards: Utah CCA New Teacher Training*, Utah State Board of Education Conference for CCA Teachers, Granite Technical Institute, Salt Lake City, UT, July

Shumway, S. (2018). *Keeping the Spiritual Lifeblood Flowing,* Brigham Young University Devotional Address, June 26, 2018. Published in Brigham Young University Speeches, 2017-2018, pp. 169-174. SPEECHES.BYU.EDU

Shumway, S. (2018). *Incorporating the Engineering Design Process into the Elementary School Classroom*, Keynote Address: Cohort C Summer Professional Development (700 teachers), Orem High School; June 15; Cohort B Summer Professional Development (250 teachers), Timpanogos High School, June 11.

Shumway, S. (2017). *What can we do with the T&E in K-12 STEM education?* Utah Council for Citizen Diplomacy. Presentation to international scholars sponsored under the auspices of the United States Department of State - International Visitor Leadership Program. Westminster College, Salt Lake City, UT, April 6.

Shumway, S. (2017). *Integrating the engineering design process into the elementary school classroom: Best practices and lessons learned.* The David O. McKay School of Education and the Brigham Young University – Public School Partnership 9th Biennial Conference: Instructional Leadership in the 21st Century –March 23 &24, Utah Valley Convention Center. Provo, UT (2 sessions 200 participants each session)

Shumway, S. (2017). *The Art of Engineering*: Engineering design activity to accompany the keynote address By Dr. Jeremy Goldbogen, Hopkins Marine Station, Stanford University. Presentation given at the Arts Integration Conference: Problem Solving with STEAM, Weber State University, Feb. 10

Shumway, S. (2017). *Attaching sensor and camera devices to blue whales: A classroom engineering activity to accompany research conducted by the Hopkins Marine Station, Stanford University.*  Presentation given at the Arts Integration Conference: Problem Solving with STEAM, Weber State University, Feb. 10

Shumway, S. (2015). *Implementing integrated STEM activities into elementary classrooms: Best practices.* Utah STEM Action Center's Best Practices Conference, Thanksgiving Point, UT. June 22.

Shumway, S. (2015). *The natural connections between the arts and engineering (STEAM): Designing an artistic robot*. Arts Express Conference, CITES, Vista Heights Middle School, Saratoga Springs, UT, June 10.

Shumway, S. (2015). *Integrating STEM into the elementary school classroom*. Utah Principals STEM Academy: Utah State Office of Education, Grandview Professional Development Center: Provo School District, January 23.

Shumway, S. (2014). *The art of the engineering: Integrated STEAM education*. The Learning Edge – Annual Administrators Conference: Provo Marriott, November 18.

Shumway, S., and Flox, C. (2014). *The art of the engineering design process*. The BYU Museum of Art Presents: *Edward Burtynsky - The Industrial Sublime*: An Evening for Educators; February 12.

Shumway, S (2014). *Teaching the engineering design process to middle school students: Artistic robots*. Utah Association for Career and Technical Education Annual Conference, Westlake High School. Jan. 31-Feb.1.

Shumway, S. (2011). *Basic electronics for middle school students.* Utah Association for Career and Technical Education Annual Conference, Westlake High School, January 14-15.

Shumway, S. (2010). *Infusing engineering into K-12 education*. Instituto Technologico de Santo Domingo (INTEC): In association with MACILE (Mathematicas, Ciencias, Ingenieria, Lenguaje), Santo Domingo, Dominican Republic, June 29, 2010.

Shumway, S. (2009) *Technological literacy: Case studies*. Keynote Address, Utah State Office of Education Summer Conference for Technology & Engineering Teachers: Pleasant Grove High School, Pleasant Grove, Utah, June 17-18, 2009.

Shumway, S. (2009). *The Empower Playgrounds project in Ghana, West Africa: A case for technological literacy*. Keynote Address, Alaska Career and Technical Education Association Winter Conference, Anchorage, Alaska, Feb. 4-5.

Shumway, S. (2009). *Technology education beyond the textbook*. Alaska Career and Technical Education Association Winter Conference, Anchorage, Alaska, Feb. 4-5.

Shumway, S. (2009). *Instructional strategies for teaching high school students about batteries*. Utah State Office of Education Summer Conference for Technology & Engineering Teachers: Pleasant Grove High School, Pleasant Grove, Utah, June 17-18, 2009.

Shumway, S. (2008). *Technology and engineering curriculum: Empower Playgrounds.* Presentation to members of the Ghanaian Ministry of Education as part of the part of Empower Playgrounds Project: Accra, Ghana, West Africa.

Shumway, S., Hansen, D., Wagner, D., Fisher, D., & Stephenson, A. (2005). *In-service that matters – CTTE/TfAAP Special Interest Session*. 67th Annual International Technology Education Association Conference, Kansas City, Missouri.

Shumway, S (2004). *Implementing the standards for technological literacy: A practicum.* Florida Association for Career and Technical Education Conference, Tampa, FL. July 22.

Barnette, E., Daugherty, M., Reeve, E. & Shumway, S. (2004). *How vendors can implement all four sets of the ITEA Standards.* 66th Annual International Technology Education Association Conference, Albuquerque, New Mexico.

Shumway, S., Berrett, J. & Nielsen, S. (2004). *Teaching middle school students robotics with Lego© Robolab*. Utah Association for Career & Technology Education Winter Conference, St. George, UT.

Shumway, S. (2004). *The standards for technological literacy: Incorporation into the technology education classroom*. Anchorage School District 14th Annual Vocational, Career and Technology Education Professional Conference: Anchorage, Alaska.

Shumway, S. (2003). *Technology activities for high school students.* Utah Association for Career and Technical Education Annual Winter Conference, Utah Valley State College, Provo, Utah.

Shumway, S. (2001). *Classroom motivation and the applied technology educator*. 2001 Applied Technology Education - Health Science and Technology Conference, August 1, Snow College-South Campus, Richfield UT.

Shumway, S. (2000). *Pre-engineering and technology education*. International Technology Education Association Council for Supervisors: Salt Lake Forum, Salt Lake City, Utah.

Shumway, S. & Erekson, T. (2000). *Implementing pre-engineering activities into the technology education curriculum.* Utah Association for Career and Technical Education Annual Winter Conference, Utah Valley State College, Provo, Utah.

Shumway, S. (1999). *How to recruit and retain students*. Presented at the Utah Vocational Association Annual Winter Conference, Timpview High School, Provo, Utah.

### INVITED PROFESSIONAL DEVELOPMENT WITH EDUCATIONAL AGENCIES

Note: The following are professional development sessions that I have been invited to conduct for various local, national and international educational agencies.

Granite School district; August 4-5, GTI

Provo district – June K-5th grade

Shumway, S, (2019). *Integrated STEM curriculum development*: Professional development for elementary school teachers. Washington County School District, St George, UT. Washington Co. School District Office, August 19-21.

Shumway, S, (2019). Engineering Content for Elementary-Level STEM Endorsements: Utah State Board of Education. Professional Development conducted for the Utah State Board of Education through BYU Conferences and Workshops in conjunction with BYU Physics Education, June 24 – 28.

Shumway, S, (2019). *Integrating Engineering Activities into Middle School Career and Technical Education Courses.* Professional Development for middle school teachers in Nebo School District, June 4-6.

Shumway, S, (2019). *Integrated STEM curriculum development*: Professional development for elementary school teachers. Provo School District: Grandview Professional Development Center, Six Sessions: March- June.

Shumway, S, (2019). *Integrated STEM curriculum development*: Professional development for elementary school teachers at Crimson Ridge Elementary School, Washington Co. District. April 4-5.

Shumway, S, (2018). *Integrated STEM curriculum development*: Professional development for 3rd, 4th & 5th grade teachers. Provo School District: Grandview Professional Development Center. School District. October 3,10, 17 24.

Shumway, S, (2018). *Put a Lid on It: Designing Safety Helmets* - Engineering is Elementary, Professional development for elementary teachers conducted for the Boston Museum of Science, funded by Dell Computers. Davis School District Offices, Nov. 14.

Shumway, S, (2018). *Integrated STEM curriculum development*: Professional development for elementary school teachers at Crimson Ridge Elementary School, Washington District. March 21-22.

Shumway, S, (2018). *Integrated STEM curriculum development*: Professional development for elementary school teachers at Bella Vista Elementary School, Canyons District. Oct 8 & Dec. 3.

Shumway, S, (2018). *Integrated STEM curriculum development*: Alpine District Cohort B. Professional development for elementary teachers participating in the Apollo Project. University Mall Conference Center, Orem, UT, Four afternoon sessions, March-April.

Shumway, S, (2018). *Sixth Grade STEM Course for Career and Technology Education*: Utah State Board of Education. Professional development conducted at Springside Elementary School, Saratoga Springs, July 9-10.

Shumway, S, (2018). *Integrated STEM curriculum development*: Professional development for elementary school teachers at Blackridge Elementary School, Five Half-Day Sessions, January- March.

Shumway, S, (2017). *Integrated STEM curriculum development*: Professional development for elementary and middle school teachers at South Weber and Sunset Elementary Schools, Davis School District. April 14, Sept. 22.

Shumway, S, (2017). *Integrated STEM curriculum development*: Professional development for elementary and middle school teachers at Crimson Ridge Elementary School, Washington District. Sept. 11-12.

Shumway, S, (2017). *Integrated STEM curriculum development*: Professional development for elementary and middle school teachers at Bella Vista Elementary School, Canyons District. May 4, Oct. 16, Nov. 8.

Shumway, S, (2017). *Integrated STEM curriculum development*: Alpine District Cohort B. Professional development for elementary teachers participating in the Apollo Project. Orem, UT, May 30-June 2, June 5-8, June 12-15.

Shumway, S, (2016). *Integrated STEM curriculum development*: Professional development for elementary school teachers at Jordan School district, Riverton, UT, June 21-23.

Shumway, S, (2016). *Integrated STEM curriculum development*: The Apollo Project. Professional development for elementary teachers participating in the Apollo Project. Orem, UT, May 31-June 3, June 6-9, June 13-16.

Shumway, S, (2016). *Integrated STEM curriculum development*: Professional development for elementary and middle school teachers in Provo School District, Provo, UT, May 10, 12, 13, 16, 17, 18.

Shumway, S, (2016). *Integrated STEM curriculum development*: Professional development for elementary and middle school teachers at Blackridge Elementary School, Spring 2016 – Six Full-Day Sessions, Fall 2016 – Six Full-Day Sessions.

Shumway, S, (2016). *Integrated STEM curriculum development*: Nebo District STEM Endorsement Class, Spanish Fork, UT, 13 sessions during Winter Semester, 2016.

Shumway, S. (2016). *Lesson study approach: Engineering activities for the elementary school classroom*: Series of seven STEM lesson study activities with K-6th grade elementary school teachers at Foothill Elementary: Alpine School District, January – February.

Shumway, S, (2015). *Integrated STEM curriculum development*: Professional development for elementary and middle school teachers at Regan Academy, Springville, UT, August 12.

Shumway, S. (2015). *Engineering activities for the elementary education classroom*: Integrated STEM curriculum professional development for fifth-grade elementary school teachers in the Jordan School District, June 17-19.

Shumway, S. (2015). *Engineering activities for the elementary education classroom*: Integrated STEM curriculum professional development for fourth, fifth and sixth-grade elementary school teachers in the Provo School District, June 8-12.

Shumway, S. (2015). *Engineering activities for the elementary education classroom*: Integrated STEM curriculum professional development for elementary school teachers in the Alpine School District, June 1-5.

Shumway, S. (2015). *Lesson study approach: Engineering activities for the elementary school classroom*: Series of seven STEM lesson study activities with K-6th grade elementary school teachers at Foothill Elementary: Alpine School District, January – March.

Shumway, S., & TEE Students (2015). *Heat loss lab*: Integrated STEM activities developed and team taught with sixth-grade teachers at Westridge Elementary School, Provo School District, January 23.

Shumway, S. (2014). *Engineering activities for the elementary education classroom*: Engineering is Elementary Model: STEM curriculum professional development for fourth-grade elementary school teachers in the Jordan School District, June 16-20.

Shumway (2014). *Engineering activities for gifted and talented students*: Teacher curriculum professional development, Alpine School District Office, May 15.

Shumway, S. (2014). *Engineering activities for the elementary education classroom*: Engineering is Elementary Model: STEM curriculum professional development for K-6th grade elementary school teachers at Foothill and Grovecrest Elementary Schools: Alpine School District, Feb. 21, 28, August 14, Sept 30, October 14, 28.

Shumway, S. (2014). *Engineering activities for the elementary education classroom*: Engineering is Elementary Model: STEM curriculum professional development for sixth-grade elementary school teachers in the Provo School District, June 9-13.

Shumway, S. (2013). *Engineering activities for the elementary education classroom*: Engineering is Elementary Model: STEM curriculum professional development for fifth-grade elementary school teachers in the Provo School District, June 4-8.

Shumway, S. (2012). *Engineering activities for the elementary education classroom*: Engineering is Elementary Model: STEM curriculum professional development for fourth-grade elementary school teachers in the Provo School District, June 4-8.

Shumway (2012, 2010, 2009). *Teacher Development Institute: MACILE* (Mathematicas, Ciencias, Ingenieria, Lenguaje - http://www.macile.org/en). A three-year series of week-long summer professional development sessions presented in the Dominican Republic to provide curriculum development opportunities for educators interested in advancing STEM education in Dominican schools. Nigua, Itabo and Santo Domingo, Dominican Republic.

Shumway, S. (2008). *Technology and engineering curriculum: Empower Playgrounds.* Spent 10 days providing curriculum professional development for Ghanaian teachers and students on how to teach STEM content related to the Empower Playgrounds Project: Empower Playgrounds (http://emplay.squarespace.com), Ghana, West Africa.

Shumway, S. (2007). *Developing curriculum for high school technology and engineering teachers*: Professional development conducted for the National Center for Engineering and Technology Education: Sponsored by the National Science Foundation. North Carolina A&T University Greensboro, NC.

Shumway, S. (2007). *Engineering design activities in the technology education classroom*. NCETE summer professional development, Illinois State University, Bloomington, IL.

Shumway, S., Erekson, T., Berrett, J., Terry, R. (2007). *Developing curriculum for high school technology and engineering teachers*: Professional development conducted for the National Center for Engineering and Technology Education: Sponsored by the National Science Foundation. Hurricane High School, Hurricane, UT.

Shumway, S., Erekson, T., Berrett, J., Terry, R. (2006). *Developing curriculum for high school technology and engineering teachers*: Professional development conducted for the National Center for Engineering and Technology Education: Sponsored by the National Science Foundation. Snow Canyon High School, St. George, UT.

Erekson, T., Metzer, N., Shumway, S., Berrett, J. (2006). Design *and development of an electrathon for teaching high school engineering*: Three-day professional development conducted for the National Center for Engineering and Technology Education: Sponsored by the National Science Foundation. Brigham Young University, Provo, UT.

Shumway, S. (2004). *Writing standards-based curriculum*: Standards Specialist professional development given at the 19th Annual Rocky Mountain States Conference: Colorado State University, Fort Collins, Colorado, Nov. 10-12. Professional development delivered as part of the *Technology for All Americans Project* – International Technology Education Association.

Shumway, S. (2004). *Microcontrollers and automation for high school pre-engineering courses*: Manatee, Sarasota & Polk School Districts - Technology education summer professional development: Bradenton, Florida, June 1-3 & July 26-28.

Shumway, S. (2003). *Methods for teaching high school students basic series and parallel circuits*. Utah State Office of Education summer professional development for Principles of Technology Teachers: West Jordan High School, West Jordan, Utah, June 17.

Shumway, S. (2003). *Writing standards-based curriculum*: Standards Specialist professional development given at the Anchorage School District Technology Education Summer Conference: Anchorage, Alaska, June 9-10. Professional development delivered as part of the *Technology for All Americans Project* – International Technology Education Association.

Shumway, S. (2003). *Writing standards-based curriculum:* Standards Specialist professional development given at the Manatee/Sarasota School District Technology Education Summer Conference: Sarasota, Florida, June 2-3. Professional development delivered as part of the *Technology for All Americans Project* – International Technology Education Association.

Shumway, S. (2002). *Writing standards-based curriculum:* Standards Specialist professional development given at the North Dakota Technology Education Association Summer Conference: Bismarck, North Dakota, August 6-7. Professional development delivered as part of the *Technology for All Americans Project* – International Technology Education Association.

Shumway, S. (2002). *Writing standards-based curriculum:* Standards Specialist professional development, Participants from Texas, Oklahoma and Louisiana: Dallas, TX, July 14-15. Professional development delivered as part of the *Technology for All Americans Project* – International Technology Education Association.

Shumway, S. (2002). *Writing standards-based curriculum:* Standards Specialist professional development given to the Florida Technology Education Association: University of South Florida, Tampa Bay, FL, February, 24-25. Professional development delivered as part of the *Technology for All Americans Project* – International Technology Education Association.

Shumway, S. (2001). *Teaching high school students how to rectify alternating current to direct current: Instruction and development of a demonstration aide*. Utah State Office of Education summer professional development for Principles of Technology Teachers: West Jordan High School, West Jordan, Utah, August.

Shumway, S. (2001). *Oscilloscope activities for principles of technology classes*. Utah State Office of Education summer professional development for Principles of Technology Teachers: Lone Peak High School, Highland, Utah, August.

Shumway, S. (2000). *Useable electronics for foundations of technology and pre-engineering classes*. Utah State Office of Education summer professional development for Foundations of Technology Teachers at Jordan High School, Sandy, Utah, July.

Shumway, S. (1998). *Basic stamps and other fun interface activities for high school students.* Mountain Lands Region Electronics Teachers: Timpview High School, Provo, UT.

Shumway, S. (1994). *Introduction to computer interfacing*. Eight Week professional development for Jordan School District Electronics Teachers: Brighton High School, Sandy, UT.

### PARTICIPATION IN FUNDED GRANTS

2013-2015 (Co-PI). *Advancing Informal STEM Learning Through Alternate Reality Games*: National Science Foundation: Award # 1323787 for a total of $1,250,000. Full-Scale Development: Collaborative Research Advancing Informal STEM Learning Through Scientific Alternate Reality Games (ARG).

Note: This is a collaborative NSF grant with the University of Maryland. The University of Maryland grant is for $684,000 with Kari Kraus as PI and June Ahn as Co-PI and the BYU grant is for $1,250,000 with Derek Hansen as PI and Steve Shumway as Co-PI.

My primary responsibilities with this grant included:

* Collaboration on writing the grant and developing the research questions.
* Serving as the liaison between the university and the public schools in identifying schools, teachers and students to participate in the grant.
* Working with the University of Maryland, the BYU Laycock Center and students at Dixon Middle School in the co-design of the ARG story (see <https://fallingdust.com/>.
* Working with the University of Maryland in providing professional development in the form of workshops to educators (public school, home school, museum, public library).
* Conducting research on the co-design and implementation process of an ARG into various educational environments.

### 2010 (Co-PI). *Family Engineering:* Michigan Tech, American Society for Engineering Education, Foundation for Family Science and Engineering: Developed with support from the National Science Foundation, $7,800.

My primary responsibilities with this grant included:

* Working with Thanksgiving Point Museum and students in the Technology and Engineering Education Program at BYU in providing a series of Family Engineering Nights at the museum.
* Collaborating with Michigan Tech University in the development of engineering activities for families. Curricular activities developed as a result of this grant were included in a book published by the Foundation for Family Science and Engineering: <http://www.familyengineering.org/>

2009-2010. BYU MEG Grant (PI): *Collaborative Cross-Discipline Multicultural Experiential Learning: Building A Sustainable Education Program in the Dominican Republic,* $20,000

My primary responsibilities with this grant included:

* Developing a summer study-abroad program for BYU students to teach technology and engineering content to middle and high school students in the Dominican Republic.
* Providing professional development for the Dominican teachers.
* Note: This program extended over three summers.

2004-2009. (Co-Director of Brigham Young University Site): *National Center for Engineering and Technology Education* (NCETE). NCETE is a partnership of four land-grant research universities (Utah State University, the University of Minnesota, the University of Illinois and the University of Georgia), five technology teacher education universities (Brigham Young University, California State University at Los Angeles, University of Wisconsin-Stout, Illinois State University and North Carolina A&T State University) and fifteen K-12 school districts. The center was funded for $10,000,000 by the National Science Foundation in 2004 under NSF program award 0426421 <http://ncete.org/flash/index.php>

Note: According to the information entered by the university in the funded research portion of my faculty profile, BYU’s allocation on this grant was approximately $150,000 for 6 years.

Role as co-director of the BYU site was to work with other the other technology teacher education institutions at Cal State LA, UW-Stout, Illinios State and North Carolina A&T in providing curriculum development and professional development for participating K-12 school districts.

**PROFESSIONAL SERVICE/COMMITTEE ASSIGNMENTS**

##### College/School Service

Associate Director – School of Technology (2018- Present)

Chair – School of Technology Advancement and Rank Committee (2018-Present)

Program Chair - Technology and Engineering Education Program (2002 – 2011 & 2013 - 2016).

Member – Ira A. Fulton College of Engineering and Technology: Teaching and Learning Committee (2010 – 2013 & 2017- 2018)

Member – School of Technology Facilities Committee (2012-Present).

Member – Technology and Engineering Education Undergraduate Program (1993 - Present).

Member - School of Technology Graduate Committee – Technology Education Emphasis (2002-2004).

Chair - BYU Applied Technology Fair (1996-2001).

Advisor – Technology and Engineering Education Collegiate Association (TEECA): BYU Chapter (1993 - Present).

##### University Service

Member –TEAC Accreditation Team (TAT): McKay School of Education and BYU Educator Preparation Programs (2013-2014).

Member – University Athletic Advisory Council (UAAC), (2012-2014).

Member – University Faculty Advisory Council (FAC), (2011-2014).

Member – Teacher Education Secondary Design Committee: McKay School of Education (2002- 2011).

Member - Center for the Improvement of Teacher Education and Schooling (CITES): McKay School of Education and Partnership School Districts (2004- Present).

Member - Search Committee, Brigham Young University Director of Educator Preparation Programs (2015).

##### Professional Service

President: Council on Technology and Engineering Education (CTETE): 2019-2020.

Member: Technology and Engineering Standards Revision Committee (ITEEA, NSF, NASA).2019

Member – International Technology and Engineering Educators Association (ITEEA): Board of Directors - Region Four Director (2010 – 2012).

Chair – Council for Technology and Engineering Teacher Education (CTETE): Teacher Education Committee (2008-2014).

President/Elect/Past: Utah Trades and Technology Educators (2001-2004).

Member: Advisory Board for the Utah Association for Career & Technical Education (2000-2003).

Member: Utah State Office of Education (USOE) Technology & Engineering Advisory board (2013 – Present).

Member - International Technology Education Association Elections Committee (2002-2003).

Member – Deseret News Sterling Scholar Selection Committee (2002, 2006).

Member - Program Standards Team Member - *Technology for All Americans Project.* International Technology Education Association (ITEA) (2001-2006).

Region 4 Standards Specialist – *Technology for all Americans Project*, International Technology Education Association (ITEA) (2001 – 2006).

Member – Utah Technology Student Association (TSA) Advisory Board and Competition Committee (2000 – Present).

Member - International Technology and Engineering Education Association – Conference Review Committee (1999 – 2000 & 2012-Present).

Member: Utah Technology & Engineering Educator’s (UTEE) Advisory Board (2004-Present).

Member - Utah State Office of Education -Principles of Technology Committee (1999-2008).

Member - Utah State Office of Education -Foundations of Technology Committee (1996-2000).

Member - Utah State Office of Education Accreditation Committee (Served on the accreditation committee for the following institutions: Hillcrest High School, Jordan High School, North Sevier Area Technical Center, Richfield Utah).

Competition Judge for the following Middle and High School Competitions:

Utah State Technology Student Association (TSA) Competition (2000-2015).

First Lego League Competition: Utah County Region (2011-2015).

Utah State MESA (Mathematics, Engineering, Science, Achievement) Competition (2015).

VEX Robotics Competition: Northern Utah Region (2015).

Event Coordinator: Technology and Engineering Education Collegiate Association (TEECA) – Robotics Competition (2011-2013).

Reviewer: Utah STEM Action Center Student Student Fairs, Camps and Competitions Grant (2015).

Member- Empower Playgrounds Education Program: Develop science curriculum and provide professional development for students and teachers in Ghana, West Africa (2007-2009).

Member: Matematicas, Ciencias, Ingeniera, Lenguaje (MACILE) Education Program: Develop science, technology and engineering curriculum and provide professional development for students and teachers in the Dominican Republic (2008-Present).

### HONORS/AWARDS

2018 Brigham Young University Devotional Address, June 26.

2017 Karl G. Maeser Excellence in Teaching Award – Brigham Young University

2016 Mentor Award – Utah STEM Action Center – Utah’s STEM Innovation Awards.

2016 Silvius/Wolansky Award: Council on Technology and Engineering Teacher Education (CTETE) Outstanding Publication Award.

2015 Outstanding Faculty Teaching Award – School of Technology.

2012 Outstanding Faculty Teaching Award – School of Technology.

2011 Outstanding Faculty Teaching Award – School of Technology.

2010 Excellence in Education Award – Ira A. Fulton College of Engineering and Technology.

2008 Benjamin Cluff Jr. Distinguished Educator Award, McKay School of Education, Brigham Young University.

2008 Distinguished Faculty Advisor Award, Technology Education Collegiate Association.

2007 Twenty-first Century Leader Associate, Council on Technology Teacher Education.

2006 Outstanding Faculty Award, School of Technology: Ira A Fulton College of Engineering and Technology- Brigham Young University.

2004 National Association of Industrial and Technical Teacher Educators (NAITTE) G. Harold Silvius – Outstanding Young Teacher Educator Award.

2004 International Technology Education Association – Leaders to Watch Award.

2001 Council on Technology Teacher Education - Outstanding Research Award.

2001 Utah Trade and Technology Educators - Outstanding Educator of the Year.

2000 Utah Association for Career and Technical Education - Outstanding Career and Technical Educator of the Year.

1993 Utah Industrial Education Association- Electronics Teacher of the Year.

1992 The Utah State Board of Education - Light of Learning Award.

1991 Hillcrest High School -Vocational Teacher of the Year.

### COURSES TAUGHT

**Technology Teacher Education, 1993 – 2003**

TTE 209: Basic Electricity and Electronics, 3.0

TTE 291R: Technology Education Seminar, 0.5

TTE 325: The World of Manufacturing, 2.0

TTE 465: Curriculum Development in Technology Ed., 3.0

TTE 490R: Special Topics, V1-3.0

SCED 476R: Supervision of Student Teachers, 12.0

TTE 630: Adult Vocational and Technology Programs, 2.0

TTE 640: Coordination and Supervision of Applied Tech Ed Programs, 2.0

TTE 645: Visual and Graphic Presentations in Voc. and Technology Programs, 2.0

TTE 694R: Readings and Conference, V1-3.0

Technology 695R: Special Topics, V1-3.0

Technology 698R: Masters Project, V1-6.0

Technology 699R: Masters Thesis, V1-6.0

**Technology and Engineering Education (TEE) 2004 - Present**

TEE 225: Electronics for Technology and Engineering Teachers, 3.0

TEE 229: Processes and Manufacturing with Metals and Polymers, 3.0 (Team taught this class – one of three faculty)

TEE 330: Creativity, Engineering & Problem Solving, 3.0

TEE 340: Principles of Technology and Engineering, 3.0

TEE 377: Instructional Methods in Technology and Engineering Education, 2.0

TEE 378: Practicum in Technology and Engineering Education, 2.0

TEE 490R: Independent Research and Development, 3V

TEE 593R: Workshop in Applied Technology Education, 2V

TEE 610: History and Legislation of Vocational and Technology Programs, 2.0

TEE 625: Teaching and Learning in Technology Education, 2.0

TEE 695R: TEE Special Topics, 3V

 ELED 589R: STEM Practices: CITES Winter 2016

Utah State University, 1994 - 1995

 Industrial Technology and Education 232, Design and Production of Printed Circuit Boards