M. SHANE TUTWILER

710 Chafee Hall, 10 Chafee Rd, Kingston, RI 02881
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Google Scholar: http://bit.ly/tutwiler

Research Interests: quantitative research methods, educational psychology, science education, virtual & augmented environments, educational technology

EDUCATION

HARVARD UNIVERSITY, Cambridge, MA   2014
Graduate School of Education
Doctor of Education, Human Development & Education

HARVARD UNIVERSITY, Cambridge, MA   2007
Graduate School of Education
Master of Education, Technology, Innovation, & Education

TEMPLE UNIVERSITY, Philadelphia, PA   2006
College of Education
Bachelor of Science, Science Education, *summa cum laude*
PA 7-12 General Science Certification (85-07609243-61)

NAVAL NUCLEAR PROPULSION TRAINING PROGRAM, Charleston, SC   1998
Department of Defense/Department of Energy Certification
Nuclear Mechanical Operation, Nuclear Water Chemistry, and Radiation Health Physics

ACADEMIC APPOINTMENTS

UNIVERSITY OF RHODE ISLAND, South Kingston, RI
School of Education
Associate Professor   2022 -
Assistant Professor   2017 - 2022

UNIVERSITY OF CONNECTICUT, Storrs, CT
National Center for Research on Gifted Education
Postdoctoral Research Fellow   2016 - 2017

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA
STEP Lab
Visiting Lecturer   2016 - 2016

HARVARD UNIVERSITY, Cambridge, MA
Graduate School of Education
Postdoctoral Research Fellow & Lecturer on Education   2014 - 2017

UNIVERSITY OF ST. JOSEPH, West Hartford, CT
School of Education
Adjunct Professor   2013 - 2014

RESEARCH & EVALUATION FUNDING

INTERNAL
PI, Mountain Rescue: Pilot Study, URI School of Education, $1,600. 2021.

Co-PI, Research exploring virtual experiences and learning (REVEAL), MIT Integrated Learning Initiative Grant, $130,000. (PIs: Klopfer & Thompson). 2019-2020.

PI, Evaluating GEMS-Net, URI School of Education, $2,500. 2018.

EXTERNAL
Advisory Board, Collaborative Research: Accessible Computational Thinking in Elementary Science Classes within and across Culturally and Linguistically Diverse Contexts, NSF, 2101526 (PI: Ketelhut). 2021-2024

Co-PI, EAGER: Collaborative Research: Networking Faculty Seeds for Collective Change in the Geosciences, NSF, 2039222, $299,763 (sub-award: $13,864.00). (PI: Chen). 2020-2022

Co-PI, PurpleState 2.0: Investigating the Impact of a Virtual Internship on Argumentative Reading and Writing in Civic Education, IES, R305A190476, $1,356,611 (sub-award: $28,000). (PI: Stoddard). 2019-2022

Postdoctoral Research Fellow, EcoXPT: Learning about Ecosystems Science and Complex Causality through Experimentation in a Virtual World, National Science Foundation, DRL-1416781, $2,915,750. (PI: Grotzer). 2014-2020

Quantitative Consultant, EcoMOD: Computational Thinking into Ecosystems Science Education via Modeling in Immersive Virtual Worlds, National Science Foundation, DRL- 1639545, $2,442,889.00 (PI: Dede). 2016-2021

External Evaluator, Learning Physics in a Synergistic Scaffolded Programming Environment, National Science Foundation, DRL – 1741756, $1,018,429 (PI: Kitagawa). 2017-2021

Quantitative Consultant, Collaborative Research: GEODES: Geoscience Diversity Experiential Simulations, National Science Foundation, ICES – 1645444, $196,007.00 (PI: Chen). 2017-2020

COURSES TAUGHT

UNIVERSITY OF RHODE ISLAND, South Kingston, RI
- EDC 312 – The Psychology of Learning (Undergraduate)
- EDC 102 – Intro to American Education (Undergraduate)
- EDP 641 – Field Research Seminar (Graduate)
- EDC 586 – Applied Regression: Generalized Linear Models (Graduate)
- EDP 610 – Issues in Educational Inquiry (Graduate)

MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA
- 11.125 – Introduction to Education (Undergraduate)

HARVARD UNIVERSITY, Cambridge, MA
- S-040 – Introduction to Applied Data Analysis (Graduate)

UNIVERSITY OF ST. JOSEPH, West Hartford, CT
- EDUC536 – Technology for Learners (Graduate)
- EDUC515 – Educational Research (Graduate)
- EDUC590 – Special Topics: Introduction to Measurement (Graduate)

ADVISING & THESIS COMMITTEE MEMBERSHIP

DEFENDED (*BOLD* = Major Professor)
Dan Riley (MA, URI)
Molly H. Goldstein (PhD, Purdue University)
Cathy Kocak (PhD, URI/RIC)
John Olerio (PhD, URI/RIC)
Amy Correia (PhD, URI/RIC)
Wendy Amelotte (PhD, URI/RIC)
Corinne Kulesh (PhD, URI/RIC)
Jessica Richardi (PhD, URI/RIC) (Assistant Professor, Coastal Carolina University)

IN PROCESS
Qingyu Yang (PhD, URI/RIC)
Christina Lee (PhD, URI/RIC)
Yiping Zhang (PhD, URI/RIC)
Jennifer Stoudt (PhD, URI/RIC)

PUBLICATIONS IN PROCESS

1. Bressler, D.M., **Tutwiler, M.S.,** & Annetta, L.A. (in preparation). Working as intended? How fidelity and flow impact learning in a game-based science curriculum

2. **Tutwiler, M.S**., Foglemen, J., Sweetman, S., Richardi, J., Popoola, R., (in preparation). Evaluating the GEMS-Net PD Program: A Cohort-Based Study of Longitudinal Student STEM Outcomes

3. Hawthorne-Kocak, C., & **Tutwiler, M.S.** (in preparation). Investigating the relationship between teacher agency, student engagement, and student achievement

4. Kao, S.Y.Z., **Tutwiler, M.S**., Ekwueme, D.U. (under review). Imputation for suppressed data – An application for suppressed county-level COVID-19 death data

PEER REVIEWED PUBLICATIONS

1. Bressler, D.M., **Tutwiler, M.S.**, Siebert-Everstone, A., Annetta, L.A., Chen, J.A. (2022). "What if we explore…" Promoting Engaged Learning and Collaboration with MOUNTAIN RESCUE. *Simulation & Gaming.* https://doi.org/10.1177/10468781221120690

2. Thompson, M., Barrasso, A., **Tutwiler, M.S.**, Garik, P. Spilios, K. (2022). Context matters: Influence of undergraduates' approaches, experiences, and expectations on the LA Model in large enrollment science courses. *Educational Innovations & Emerging Technologies.* 2(1):33-55.

3. Bressler, D.M., **Tutwiler, M.S.,** & Bodzin, A.M. (2021). Promoting student flow and interest in a science learning game: A design-based research study of School Scene Investigators. *Educational Technology Research & Development* 69, 2789–2811. https://doi.org/10.1007/s11423-021-10039-y

4. Thompson, M., Uz-Bilgin, C., **Tutwiler, M. S.**, Anteneh, M., Meija, J. C., Wang, A., ... & Klopfer, E. (2021). Immersion positively effects learning in virtual reality games compared to equally interactive 2d games. *Information and Learning Sciences.* *http://dx.doi.org/10.1108/ILS-12-2020-0252*

5. Flippin, M., Clapham, E. D., & **Tutwiler, M.S.** (2021). Effects of using a variety of kinesthetic classroom equipment on elementary students' on-task behaviour: a pilot study. *Learning Environments Research*, 24:137–151.

6. Chen, J. A., **Tutwiler, M.S.**, & Jackson, J. F. (2020). Mixed-reality simulations to build capacity for advocating for diversity, equity, and inclusion in the geosciences. *Journal of Diversity in Higher Education*. https://doi.org/10.1037/dhe0000190

7. Cuzzolino, M. P., Grotzer, T. A., **Tutwiler, M.S.**, & Torres, E. W. (2019). An agentive focus may limit learning about complex causality and systems dynamics: A study of seventh graders' explanations of ecosystems. Journal of Research in Science Teaching, 56(8):1083-1105.

8. **Tutwiler, M.S.** (2019). Exploring the Relationship Between Attentional Capture and Prior Knowledge in a Science-Based Multi-user Virtual Environment: an Individual Growth Model Analysis. Journal of Science Education and Technology, 28(4):299-309.

9. Bressler, D. M., Bodzin, A. M., & **Tutwiler, M.S.** (2019). Engaging middle school students in scientific practice with a collaborative mobile game. Journal of Computer Assisted Learning, 35(2), 197-207.

10. Chen, J. A., Star, J. R., Dede, C., & **Tutwiler, M.S.** (2018). Technology-rich activities: One type does not motivate all. Contemporary Educational Psychology, 54: 153-170.

11. Hamilton, R., McCoach, D. B., **Tutwiler, M.S.**, Siegle, D., Gubbins, E. J., Callahan, C. M., ... & Mun, R. U. (2018). Disentangling the roles of institutional and individual poverty in the identification of gifted students. Gifted Child Quarterly, 62(1): 6-24.

12. Chen, J.A., & **Tutwiler, M.S.,** (2017) Implicit Theories of Ability and Self-Efficacy: Testing Alternative Social Cognitive Models to Science Motivation. *Zeitschrift für Psychologie.* 225: 127–136.

13. Chao, J., Xie, C., Nourian, S., Chen, G., Bailey, S., Goldstein, M. H., Purzer, S., Adams, R. S. and **Tutwiler, M.S.** (2017), Bridging the design-science gap with tools: Science learning and design behaviors in a simulated environment for engineering design. *J Res Sci Teach*, 54(8): 1049–1096. doi:10.1002/tea.21398

14. Grotzer, T.A., Solis, S.L., **Tutwiler, M.S.**, & Powell, M.M. (2017). A study of students' reasoning about probabilistic causality: Implications for understanding complex systems and designing instructional support. *Instructional Science.* 45(1): 25-52.

15. Chen, J.A., **Tutwiler, M.S.**, Metcalf, S.J., Kamarainen, A., Grotzer, T.A., & Dede, C.J. (2016). A multi-user virtual environment to support students' self-efficacy and interest in science: A Latent Growth Model Analysis. *Learning and Instruction.* 41:11-22.

16. Chen, J.A., Metcalf, S. J., & **Tutwiler, M.S.** (2014). Motivation and beliefs about the nature of scientific knowledge within an immersive virtual ecosystems environment. *Contemporary Educational Psychology*, 39: 112-123.

17. Grotzer, T.A., & **Tutwiler, M.S.** (2014) Simplifying Causal Complexity: How Interactions Between Modes of Causal Induction and Information Availability Lead to Heuristic-Driven Reasoning. *Mind, Brain, and Education.* 8(3):97-114.

18. Grotzer, T.A., Kamarainen, A., **Tutwiler, M.S**, Metcalf, S, & Dede, C. (2013) Learning to reason about ecosystems dynamics over time: The challenges of an event-based causal focus. *BioScience.* 63(4):288-296.

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19. Kamarainen, A. M., Metcalf, S., Grotzer, T., Browne, A., Mazzuca, D**., Tutwiler, M.S.**, & Dede, C. (2013). EcoMOBILE: Integrating augmented reality and probeware with environmental education field trips. Computers & Education, 68: 545-556.

20. Tseng, Y. H., Chang, C. Y., **Tutwiler, M.S.**, Lin, M. C., & Barufaldi, J.P. (2013). A scientometric analysis of the effectiveness of Taiwan's educational research projects. *Scientometrics*. DOI: 10.1007/s11192-013-0966-z

21. **Tutwiler, M.S.**, Lin, M. C., Chien, Y. T., Chiang, C. Y., & Chang, C. Y. (2013). The use of a gesture-based system for teaching multiple intelligences: A pilot study. *British Journal of Educational Technology,* 44(5):E133-E138.

22. **Tutwiler, M.S.**, Lin, M.C., Chang, C.Y. (2013). Determining Virtual Environment "Fit": The relationship between navigation style in a virtual field trip, student self-reported desire to visit the field trip site in the real world, and the purposes of science education. *Journal of Science Education and Technology*, 22(3): 351-361.

23. Dede, C. Grotzer, T. A., Kamarainen, A., Metcalf, S, & **Tutwiler, M.S.** (2012). EcoMOBILE: Blending virtual and augmented realities for learning ecosystems science and complex causality. *Journal of Immersive Education*. http://JiED.org/1/1/2

24. Lin, M.C., **Tutwiler, M.S**., Chang, C.Y. (2012). Gender Bias in a Virtual Learning Environment: An Exploratory Study. *British Journal of Educational Technology* 43 (2): E59-E63.

25. Metcalf, S., Kamarainen, A., **Tutwiler, M.S.**, Grotzer, T., Dede, C. (2011). Ecosystem Science Learning via Multi-User Virtual Environment. *International Journal of Gaming and Computer-Mediated Simulations.* (3)1: 86-90.

26. Lin, M.C., **Tutwiler, M.S.**, Chang, C.Y. (2011). Exploring the relationship between virtual learning environment preference, use, and learning outcomes in 10th grade earth science students. *Learning, Media and Technology* 36 (4): 399-417.

BOOKS

1. Ketelhut, D.J., & **Tutwiler, M.S.** (2017). *Science Learning and Inquiry with Technology.* Taylor & Francis, Oxfordshire, UK.

BOOK CHAPTERS & PROCEEDINGS

1. Hsu, S. Y., & **Tutwiler, M. S.** (2022, June). How Much and for Whom? A Multi-Wave Study of the Impact of Self-Regulated Learning Scaffolds on MOOC Student Academic Performance. In Proceedings of the Ninth ACM Conference on Learning@ Scale (pp. 350-354).

2. Brand, S. T., & **Tutwiler, M. S.** (2022). Beyond Critical Race Theory: Infusing Culturally Relevant Pedagogy Into the K-16 Curriculum. In *Handbook of Research on Social Justice and Equity in Education* (pp. 160-182). IGI Global.

3. Bressler, D. M., & **Tutwiler, M.S.** (2021). 'Play Is Serious Learning': Using Mobile Augmented Reality Gaming to Support Science Learning. In *Handbook of Research on Innovations in Non-Traditional Educational Practices* (pp. 79-106). IGI Global.

4. **Tutwiler, M.S.** (2019). Post-hoc Bayesian Hypothesis Tests in Epistemic Network Analyses. In *Advances in Quantitative Ethnography* (pp. 342-348). Springer, Cham.

5. Kamarainen, A.M., Thompson, M.M., Metcalf, S.J., Grotzer, T.A., **Tutwiler, M.S.**, Dede, C. (2018, June). Prompting Connections between Content and Context: Blending Immersive Virtual Environments and Augmented Reality for Environmental Science Learning. In Beck, D., Allison, C., Morgado, L., Pirker, J., Khosmood, F., Richter, J., & Gütl, C. (Eds.). (2018*). Proceedings of the Immersive Learning Research Network: Fourth International Conference, iLRN 2018*, Missoula, Montana, June 24–29, 2018. Proceedings (Vol. 840), pp. 36–54, Springer.

6. **Tutwiler, M.S.**, & Grotzer, T.A. (2013). Why Immersive, Interactive Simulation Belongs in the Pedagogical Toolkit of "Next Generation" Science: Facilitating Student Understanding of Complex Causal Dynamics. In M. Khine, & I. Saleh (Eds*.), Approaches and Strategies in Next Generation Science Learning* (pp. 127-146). Hershey, PA

WHITE PAPERS

1. Ketelhut, D.J., & **Tutwiler, M.S.** (2013). Using Learning Games to Support College Readiness: Summary of selected findings from the Next Generation Learning Challenges Wave 2. White Paper prepared for the Bill & Melinda Gates Foundation.

2. **Tutwiler, M.S.** (2022). REI Evaluation Analysis. White Paper prepared for Rapid Research & Evaluation, LLC.

3. **Tutwiler, M.S.** (2022). CACF Longitudinal Analysis. White Paper prepared for Rapid Research & Evaluation, LLC.

INVITED TALKS & KEYNOTES

1. Tutwiler, M.S.(2023, February). Introduction to applied Bayesian Data Analysis. National Taiwan Normal University Workshop, Taipei, Taiwan.

2. Tutwiler, M.S. (2023, February). Should we treat classrooms as laboratories? Perspectives on research of emerging educational technologies. IEEE ECEI 2023 Keynote, Singapore.

3. Tutwiler, M.S. (2022, February). Robust Design Based Research in the Study of Educational Innovation. IEEE ECEI 2022 Keynote, Keelung, Taiwan.

4. Tutwiler, M.S. (2019, May). Robust Design Based Research. Massachusetts Institute of Technology Invited Talk, Cambridge, MA.

5. Tutwiler, M.S., & Grotzer, T.A. (2014, November). Shortcuts and short-circuits: Heuristics and default assumptions in Bayesian causal learning models. International Mind, Brain, and Education Society (IMBES) Invited Talk, Fort Worth, TX.

6. Tutwiler, M.S. (2012, January). Applied Regression Analysis in Educational Research. National Taiwan Normal University Invited Talk, Taipei, Taiwan.

CONFERENCE PRESENTATIONS

1. Chen. J.A., Tutwiler, M.S., Brohinsky, J., Behnke, D., Stoddard J. (2022, August). Bayesian Imputation to Account for Missingness in Pandemic Classroom Conditions. American Psychological Association (APA), Minneapolis, MN.

2. Bressler, D., Tutwiler, M.S., Siebert-Evenstone, A., Annetta, L., & Chen, J.A. (2022, April). "What if we explore..." Using Mountain Rescue to Promote Engaged Learning and Collaboration. National Association for Research in Science Teaching (NARST) Conference.

3. Tutwiler, M.S., Bressler, D., & Annetta, L. (2022, April). Improving Out-of-Sample Predictions via Regularizing Priors in Bayesian Regression Models: Applications to Science Education Research. National Association for Research in Science Teaching (NARST) Conference.

4. Bressler, D., Tutwiler, M.S., & Annetta, L. (2021, April). Working as Intended? How Procedural Fidelity and Flow Impact Learning in a Game-Based Science Curriculum. National Association for Research in Science Teaching (NARST) Conference.

5. Richardi, J., Tutwiler, M.S., Fogleman, J., Sweetman, S. (2021, April). Evaluating a Network Improvement Community Program: A Cohort-Based Study of Longitudinal Student STEM Outcomes. National Association for Research in Science Teaching (NARST) Conference.

6. Tutwiler, M.S., Chen, J.A., Kamarainen, A., Metcalf, S.J., Grotzer, T.A., Dede, C. (2020, March) Not all Novelty Effects Are Created Equal: Differential Gains in Self-Efficacy and Online Behavior. National Association of Research of Science Teaching (NARST) Annual Conference, Portland, OR.

7. Tutwiler, M. S., & Bressler, D. (2020, March). "Analyzing Girls' Flow Experience in an AR Game: Regularized Bayesian Regression in Design-Based Research." Paper accepted for the National Association for Research in Science Teaching (NARST) Conference, Portland, OR.

8. Bressler, D., & Tutwiler, M. S. (2020, March). "Good Learning Shouldn't Be Novel: Individual Level Impact of Collaborative Learning in Mobile Augmented Reality." Paper accepted for the National Association for Research in Science Teaching (NARST) Conference, Portland, OR.

9. Chen. J.A., & Tutwiler, M.S. (2019, August). Mixed-Reality Simulations: Building Capacity to Advocate for Diversity, Equity, and Inclusion in the Geosciences. American Psychological Association (APA), Chicago, IL.

10. Tutwiler, M.S., Newell, A., Moreno, N. (2019, April). Impact of A Contextualized Inquiry and Simulation-Based Curriculum on Student Scientific Decision Making. National Association for Research of Science Teaching (NARST), Baltimore, MD.

11. Bressler, D.M, & Tutwiler, M.S. (2019, April). The Functionality of Flow: Using Game-Based Learning to Trigger Science Interest. National Association for Research of Science Teaching (NARST), Baltimore, MD.

12. Kamarainen, A.M., Reilly, J.M., Bressler, D.M., Tutwiler, M.S., Thompson, M., Metcalf, S.J., Grotzer, T.A., Dede, C. (2019, April). Developing Scientific Explanations in the Face of Highly Variable Real World Data Collection Supported by Augmented Reality and Environmental Probeware. National Association for Research of Science Teaching (NARST), Baltimore, MD.

13. Reid, M., Tutwiler, M.S., McCoach, D.B., Hamilton, R. (2018, April). Exploring the Relationship Between District Income Segregation and Achievement in Pennsylvania. American Educational Research Association (AERA), New York, NY.

14. Tutwiler, M.S., Lin, M.C.J., Chang, C.Y. (2018, March). Gender Differences in the Engagement and Knowledge Gains of Students Using a Virtual Field Trip. National Association for Research of Science Teaching (NARST), Atlanta, GA.

15. Tutwiler, M.S., Mccoach, D.B., Hamilton, R. (2017, August). Exploring the utility of cross-classified models of achievement growth. Joint Statistical Meeting (JSM), Baltimore, MD.

16. Tutwiler, M.S., Chen, J.A., Grotzer, T.A., Dede, C.J., Metcalf, S.J., Kamarainen, A. (2017, May). Surfacing classifications of student interest in a multi-user virtual environment. Modern Modeling Methods Conference (M3), Storrs, CT.

17. Hamilton, R., Mccoach, D.B., Tutwiler, M.S., Estepar-Garcia, W. (2017, April). Identification of Gifted English Learners: An Empirical Examination of Two States. American Educational Research Association (AERA), San Antonio, TX.

18. Tutwiler, M.S., Mccoach, D.B., Hamilton, R., Seigle, D., (2017, April). Trends in Reading Growth Between Gifted and Nongifted Students: An Individual Growth Model Analysis. American Educational Research Association (AERA), San Antonio, TX.

19. Dede, C.J., Grotzer, T.A., Metcalf, S.J., Kamarainen, A.M., Tutwiler, M.S. (2017, April). EcoXPT: Learning Through Experimentation in an Immersive Virtual Ecosystem. American Educational Research Association (AERA), San Antonio, TX

20. Reilly, J.M., Kamarainen, A.M., Metcalf, S.J., Grotzer, T.A., Tutwiler, M.S., Dede, C.J. (2017, April). Evaluating Middle School Students' Integration of Variable Data in Scientific Explanations. American Educational Research Association (AERA), San Antonio, TX.

21. Cuzzolino, M.P., Tutwiler, M.S., Torres, E.W., Grotzer, T.A. (2017, April). How Problem Features Interact with the Ways that Seventh Graders Frame Agency in Ecological Problems. National Association for Research of Science Teaching (NARST), San Antonio, TX.

22. Grotzer, T.A., Metcalf, S.J., Tutwiler, M.S., Kamarainen, A.M., Thompson, M., Dede, C.J. (2017, April). Teaching the Systems Aspects of Epistemologically Authentic Experimentation in Ecosystems through Immersive Virtual Worlds. National Association for Research of Science Teaching (NARST), San Antonio, TX.

23. McCoach, D.B., Tutwiler, M.S., Hamilton, R. (2016, August). Using Empirical Bayes Residual Estimates to Identify Effective Schools. Joint Statistical Meeting (JSM), Chicago, IL.

24. Chen, J.A., Tutwiler, M.S., (2016, April). Balancing Person-Centered and Variable-Centered Approaches: Latent Growth Modeling to Explore Triggering and Maintaining Situational Interest. Presented at the annual meeting for the American Education Research Association (AERA), Washington, DC.

25. Thompson, M., Tutwiler, S., Kamarainen, A., Metcalf, S., Grotzer, T., Dede, C. (2016, April). Examining middle school students' pathways through experimentation via a virtual simulation. Related paper set presented at the National Association of Research on Science Teaching (NARST), Balitmore, MD.

26. Tutwiler, M.S., Thompson, M., Grotzer, T., Metcalf, S.J., Kamarainen, A., & Dede, C. (2016, April). Validation of an instrument measuring student complex causal assumptions. National Association for the Research of Science Teaching Conference (NARST), Baltimore, MD.

27. Thompson, M.M., Tutwiler, M.S., Metcalf, S.J., Kamarainen, A.M., Grotzer, T.A, Dede, C.J. (2016, April) A blended assessment strategy for EcoXPT: An experimentation-driven ecosystems science based multi user virtual environment. Presented at the annual meeting for the American Education Research Association (AERA), Washington, DC.

28. Tutwiler, M.S., Grotzer, T.A., Kamarainen, A.M., Derbiszewska, K., Metcalf, S.J., Dede, C.J. (2016, April). Contrasting Student Learning of Complex Causal Dynamics in a Virtual World to Direct Instruction. Presented at the annual meeting for the American Education Research Association (AERA), Washington, DC.

29. Metcalf, S., Kamarainen, A.M., Tutwiler, M.S., Thompson, M., Potsdam, H., Grotzer, T.A., & Dede, C.J. (April, 2015). Augmented reality-enhanced field trips for ecosystem science. American Educational Research Association (AERA), Chicago, IL.

30. Powell, M.M., Tutwiler, M.S., Grotzer, T.A. Metcalf, S.J., Kamarainen, A.M., Dede, C.J. (2015, April). The relationship between scripting and student data collection behaviors in a multi-user virtual environment. American Educational Research Association (AERA), Chicago, IL.

31. Donaldson Gramling, M., Solis, S.L. Derbiszewska, K.M., Oh, D., Tutwiler, M.S. & Grotzer, T.A. (2015, April). Testing a curriculum designed to build students' understanding of action at an attentional distance. National Association for Research in Science Teaching (NARST), Chicago, IL.

32. Tutwiler, M.S., Lin. P.L., Yao, B.J., Chang, C.Y. (2015, April). Comparing the Effect of Media on Measures of Scientific Literacy between Taiwanese and Chinese Students. National Association for Research in Science Teaching (NARST), Chicago, IL.

33. Grotzer, T.A., Tutwiler, M.S., Solis, S.L., Derbiszewska, K., Courter, C.J. (2014, April). Assessing the Complexity in Complex Causal Learning: Discrete Knowledge, Perception, Attention, and Reasoning. American Educational Research Association (AERA), Philadelphia, PA.

34. Grotzer. T.A., Kamarainen, A.M., Tutwiler, M.S., Metcalf, S.J., Derbiszewska, K., Courter, C.J., Dede, C. (2014, April). Using Virtual Worlds and Augmented Reality to Teach Causality Across Time and Distance in Ecosystems. American Educational Research Association (AERA), Philadelphia, PA.

35. Tutwiler, M.S., Grotzer, T.A. (2014, April). Salience and Selection: Using Growth Modeling to Explore Student Causal Data Collection in a Multi-User Virtual Environment. American Educational Research Association (AERA), Philadelphia, PA.

36. Courter, C.J., Grotzer, T.A., Derbiszewska, K.M., Powell, M., Tutwiler, M.S., Kamarainen, A., Metcalf, S., Dede, C. (2014, March). A case study contrasting students' exploration behaviors of a complex causal scenario in a virtual world: Mapping proximity and goal-directed behavior in EcoMUVE. National Association for the Research of Science Teaching (NARST), Pittsburgh, PA.

37. Tutwiler, M.S., Grotzer, T.A., Derbiszewska, K., Kamarainen, A.M., Metcalf, S.J., Dede, C. (2014, March). The Impact of Autocorrelation: Clustering and Student Outcomes in a Multi-User Virtual Environment Assessment. National Association for the Research of Science Teaching (NARST), Pittsburgh, PA.

38. Tutwiler, M.S., Grotzer, T.A. (2014, March). Comparing Paths: Bayesian Sequence Analyses in a Microgenetic Study of Student Learning. National Association for the Research of Science Teaching (NARST), Pittsburgh, PA.

39. Tutwiler, M.S. (2013, June). Learning Across Space, Time, and Scale: A Bayesian Perspective, Computer Supported Collaborative Learning(CSCL), Madison, WI.

40. Kamarainen, A., Metcalf, S.J., Grotzer, T.A., Tutwiler, M.S., Dede, C. (2013, May). EcoMOBILE: Integrating augmented reality and probe-ware with environmental education field trips. American Educational Research Association (AERA), May 1, San Francisco, CA.

41. Grotzer, T.A., Tutwiler, M.S., Metcalf, S.J., Kamarainen, A., Dede, C. (2013, April). Using a virtual world to reveal students' intuitive causal assumptions about ecosystems, National Association of Research in Science Teaching (NARST), Puerto Rico.

42. Grotzer, T.A., Tutwiler, M.S., Metcalf, S.J., Kamarainen, A., Dede, C. (2013, April). Exploring virtual worlds: Causal understanding and data-collection behaviors in an ecosystems-based multi-user virtual environment, National Association of Research in Science Teaching (NARST), Puerto Rico.

43. Metcalf, S.J., Tutwiler, M.S, Kamarainen, A., Grotzer, T.A., & Dede, C.J. (2013, April). Multi-User virtual environments to promote middle school ecosystem science learning and attitudes about science, American Educational Research Association (AERA), April 28, 2013, San Francisco, CA.

44. Chang, Y.H., Chang, C.Y., Tutwiler, M.S. (2012, December). Exploring the relationship between teacher beliefs, confidence, and practice in a curriculum reform program. ASET, Taipei, Taiwan.

45. Tutwiler, M.S., & Grotzer, T. (2012, July) Irreducible complexity: How Do Causal Bayes Nets theories of human causal inference inform the design of a virtual ecosystem? International Conference of the Learning Sciences, Sydney, Australia.

46. Grotzer, T.A., Kamarainen, A., Tutwiler, M.S., Metcalf, S., Dede, C. (2012, April). Learning to focus on processes and steady states in ecosystems dynamics using a virtual environment. Paper presented at the American Educational Research Association (AERA), Vancouver, Canada.

47. Grotzer, T. A. & Tutwiler, M.S. (2012, March). Causal tensions in reasoning about ecosystem dynamics: A theoretical analysis of supportive instructional contexts. Paper presented at the National Association of Research in Science Teaching Annual Conference (NARST), Indianapolis, ID.

48. Tutwiler, M.S., Lin, M.C., & Chang, C.Y. (2012, March). Virtual Learning Environment Preference, Perception of Helpfulness, and Achievement in Taiwanese Earth Science Students. National Association of Research in Science Teaching (NARST), Indianapolis, IN.

49. Tutwiler, M.S., Grotzer, T.A., Kamarainen, A., Metcalf, S. Dede, C. (2011, July). Exploring student understanding of complex causality in an ecosystems-based multi-user virtual environment Conference on Computer-Supported Collaborative Learning (CSCL), Hong Kong.

50. Grotzer, T.A., Tutwiler, M.S., Solis, L.S. & Duhaylongsod, L. (2011, April). Interpreting probabilistic causal outcomes in science: A microgenetic study of sixth graders' patterns of reasoning. Presented at the National Association of Research in Science Teaching (NARST), Orlando, FL.

51. Grotzer, T.A., Duhaylongsod, L. & Tutwiler, M.S. (2011, April). Developing explicit understanding of probabilistic causation: Patterns and variation in young children's reasoning. American Educational Research Association (AERA), New Orleans, LA.

52. Grotzer, T.A., Tutwiler, M.S., Dede, C. Kamarainen, A., & Metcalf, S. (2011, April). Helping students learn more expert framing of complex causal dynamics in ecosystems using EcoMUVE. Presented at the National Association of Research in Science Teaching (NARST), Orlando, FL.

53. Metcalf, S.J., Tutwiler, M.S. Kamarainen, A., Grotzer, T.A. & Dede, C. (2011, April). Learning complex causality in ecosystems via a multi-user virtual environment. American Educational Research Association (AERA), New Orleans, LA.

54. Reich, B.J.F., Tutwiler, M.S., Willett, J.B., & Murnane, R. (2011, April). Just That They'd Followed Directions. American Educational Research Association (AERA), New Orleans, LA.

55. Tutwiler, M.S. (2010, March). Pattern Recognitions: Observing Signs of Motivation of Two Adolescent Males within Multi User Virtual Environments. Harvard Graduate Student Research Conference.

FELLOWSHIPS & AWARDS

MIT Teaching Systems Lab INSPIRE Fellow, 2018
Harvard University Presidential Instructional Technology Fellow, 2010
Harvard University Intellectual Contribution & Faculty Tribute Award / Judah Schwartz Fellow, 2007
Temple University Presidential Scholar Award, 2006
Navy and Marine Corps Achievement Medal, 2002

AFFILIATIONS

National Association for the Research of Science Teaching
American Statistical Association
International Society of the Learning Sciences
American Education Research Association
American Psychological Association

UNIVERSITY SERVICE

College of Education PhD Core Curriculum Committee, **Chair**
School of Education Innovation Grant Committee**, Member**
School of Education Director Hiring Committee**, Member**
URI 101 First Year Seminar Task Force**, Member**
Like a Ram Day**, Guest Lecturer**
General Education Fair**, Presenter**

PROFESSIONAL SERVICE

EDITORIAL
Educational Psychology: An Intl. Journal of Experimental Ed. Psych.**,**
Editorial Board   2022 -
Educational Innovations & Emerging Technologies**, Editor in Chief**   2021 -
Journal of Research in Science Teaching**, Editorial Board**   2019-2022
Eurasia Journal of Mathematics, Science & Technology Education**,**
Associate Editor   2018-2020

AD-HOC REVIEW
National Science Foundation**, Grant Reviewer**
Maryland Industrial Partnership**, Grant Reviewer**
Frontiers in Psychology**, Reviewer**
Journal of Research on Technology in Education**, Reviewer**
Harvard Graduate Student Research Conference**, Reviewer & Session Chair**
Perspectives on Medical Education**, Reviewer**
Gifted Child Quarterly**, Reviewer**
Educational Administration Quarterly**, Reviewer**
Computers & Education**, Reviewer**
Information Science**, Reviewer**
Science Education**, Reviewer**
Eurasian Journal of Education Technology**, Reviewer**
National Association for the Research of Science Teaching**, Reviewer & Session Chair**

ADDITIONAL TEACHING EXPERIENCE

HARVARD UNIVERSITY, Cambridge, MA
Graduate School of Education
Teaching Fellow   2009 - 2013
- T527 – Teaching for Understanding with Technology
- T800 – Research and Evidence: Framing Scientific Research for Public Understanding
- S011 – Understanding Today's Educational Testing
- T543 – Applying Cognitive Science to Learning and Teaching

TAIPEI AMERICAN SCHOOL, Taipei, ROC (Taiwan)
Mathematics Faculty   2011 - 2012

EDUCATION FIRST, Cambridge, MA
Lead Teacher, English as a Second Language (ESL)   2008 - 2009

THE AVON OLD FARMS SCHOOL, Avon, CT
Science Faculty: Physical Science, Environmental Science, and Chemistry   2007 - 2009

JOHN W. HALLAHAN HIGH SCHOOL, Philadelphia, PA
Intern Teacher   2005 - 2006

WALTERS STATE COMMUNITY COLLEGE, Sevierville, TN
Tutor: Math, Science, & History   2003 - 2004

RESEARCH & EVALUATION EXPERIENCE

CONSULTANTS ON RESEARCH & EVALUATION, LLC, USA
Partner   2019 -

HARVARD UNIVERSITY, Cambridge, MA
Graduate School of Education
Graduate Research Assistant   2009 - 2014

NATIONAL TAIWAN NORMAL UNIVERSITY, Taipei, ROC (Taiwan)
Science Education Center
Visiting Researcher   2011 - 2012

HARVARD UNIVERSITY, Cambridge, MA
Department of Psychology
Graduate Research Assistant   2006 - 2007

TEMPLE UNIVERSITY, Philadelphia, PA
Institute for Survey Research
Supervisor   2005 - 2006

MILITARY EXPERIENCE

UNITED STATES NAVY
Engineering Lab Technician / Radiological Controls Technician   1996 - 2002
Human Resources Officer (Training & Manpower Research)   2015 - 2019