Meredith M. Thompson, Ed.D.

209 Mystic Valley Parkway
Winchester MA 01890
(617) 290-2118
meredith.m.thompson@gmail.com
meredith@mit.edu

Education

Ed.D. Science Education, Boston University, 2014.
Dissertation: *Peering through the gates: The effect of peer teaching on undergraduate satisfaction and learning outcomes in large science and engineering courses*.
Advanced to candidacy May 2013. Degree awarded in May 2014.

M.A. Education, focus in Science and Engineering. Tufts University, 2004.

B.A. Chemistry, Cornell University, 1996.

Academic Positions

Massachusetts Institute of Technology, Research Scientist, 1/16- present.

Lead and support studies in both the Teaching Systems Lab (TSL) and Scheller Teacher Education Program (STEP) labs using qualitative, quantitative, and design-based research methods. Create research instruments for data collection; analyze qualitative and quantitative data from instruments, interviews, and online data collection, and work with students and other researchers to conduct related research.

Harvard Graduate School of Education, Post-doctoral fellow, 8/14- 3/16.

Develop assessment tools and fidelity of implementation protocols for the EcoMobile and EcoXPT educational projects. Mentor masters students working as research assistants on the grant. Help develop and review curricular activities. Design survey and interview instruments, analyze data, and write manuscripts.

Harvard Medical School Course Director, 1/15 to 5/15, 2/16- 5/16.

Worked with two epidemiologists to develop lectures and a series of laboratory activities for a graduate level audience in the "Mixed Methods Research" course. Developed a series of one-hour hands on laboratory sessions to encourage students to apply the course topics to their project. Present lectures, identify additional readings, review student work, mentor students in their research projects.

Boston University Educational Assessment, Metropolitan College, 7/14 to 12/14.

Developed validity and reliability study for "Knowla", a new online assessment tool created by Prof. Eric Braude at the Metropolitan College specifically for Massive Online Open-source Courses (MOOCs). Outlined validation plan for a successful internal grant application to Boston University's Digital Learning Institute, identified assessment tools for a concurrent validity study, designed, analyzed and reported findings for conference paper presented at Learning At Scale conference and prepared manuscript for journal.

Boston University, Glenn Research Fellow, School of Education, 7/11 to 5/14.

Research Projects

Designed mixed-methods investigation of the effect of the peer teaching "Learning Assistant" program, focusing on the undergraduates who are peer teachers and the students who have peer teachers in their classes.

Co-designed investigation of different group-work strategies on student discussion quiz scores and satisfaction in a chemistry course for Sargent Health Science students.

Analyzed the frequency and context of Introductory Physics students' interactions in the online question and answer forum "Piazza" using social network analysis.

Co-designed program evaluation for neuroscience outreach program for local high school students to investigate the influence of a hands-on research experience on students' ideas of the nature of science and the process of science.

Conducted extensive review of literature on best practices in survey research design as a member of a team of graduate students working with a communications professor on a book on self-report measurement. Served as the editor for the entire team, including reviewing other research associates outlines and chapter texts.

Tufts University, Program Manager for Funded Research and Outreach Grants

Howard Hughes Medical Institute (HHMI) Professor's Award, 2007-2011

Secured grant funding to establish a partnership between Tufts and four urban school districts. Recruited 12 teachers to participate in teacher workshop and co-facilitate research experiments with Tufts Undergraduates. Recruited and managed 7 Tufts Undergraduates to serve as "Science Ambassadors" both in leading the summer workshop and in visiting classrooms throughout the year to facilitate the multi-step "Maternal Ancestry" and "Genetically Modified Soy" investigations. Managed annual budget of $250,000. Designed program evaluation and assessment for different aspects of the four-year grant as an internal evaluator.

Pre-College Engineering for Teachers (PCET)*: *2002-2007

Planned and implemented 11 summer workshops to introduce engineering design to over 800 Massachusetts teachers from grade K-12, coordinated school year support and implementation of teacher's projects, and led workshop recruitment efforts. Worked closely with external evaluator to develop measures of program impact including surveys, interviews, and focus groups. Contributed to annual reporting to the National Science Foundation (NSF).

Stony Brook University: Women in Science and Engineering (WISE) Program: 2001-2002

Designed and implemented workshops and seminars to support first and second year students in science and engineering related majors. Recruited 100 incoming first year students for WISE Scholarship. Established relationship with Society of Women Engineers (SWE) chapter and co-produced events with SWE. Started a quarterly newsletter to update students and faculty about WISE.

Goodman Research Group, Women's Experiences in College Engineering (WECE) Project: 1998-2001

Recruited and maintained contact with 52 colleges and universities for the WECE Project, a nationwide National Science Foundation (NSF) and Alfred P. Sloan funded longitudinal study of why women choose and persist in or drop out of engineering

majors in college. Gathered data from students, faculty, deans, via surveys and interviews conducted focus groups and site visits, disseminated information to stakeholders, and published paper in journal.

Publications

Walt, D.R., Kuhlik, A., Epstein, S.K., Demmer, L.A., Thompson Knight, M., Chelmow, D., Rosenblatt, M., and Bianchi, D.W. (2010). Lessons learned from the introduction of personal genotyping into a medical school curriculum. *Genetics in Medicine, 13*(1) 63-66.

Cunningham C.M., Thompson Knight, M., Carlsen, W.S. & Kelly G. (2007). Integrating engineering in middle and high school classrooms. *International Journal of Engineering Education, 23*(1), 3.

Thompson Knight, M., Huttlinger, C. Carlson, B. & Cunningham, C. (2006). Engineering in the classroom: A Low-Tech, Local Approach. *Technology Teacher, 66*(2), 18-21.

Thompson Knight, M. & Cunningham C.M. (2004). Building a structure of support: An inside look at the structure of women in engineering programs. *Journal of Women and Minorities in Science and Engineering. 10*(1-25).

Submitted Publications

Thompson M., Braude, E., (accepted, in press). Evaluation of Knowla: An Online Assessment and Learning Tool. *Journal of Educational Computing Research.*

Thompson, M., Pastorino, L., Lee, S., Lipton, P. (accepted, in press) Re-envisioning the Introductory Science Course as a Cognitive Apprenticeship. *Journal of College Science Teaching.*

Thompson, M. Lamanna, A. (submitted). Catalyzing group work in introductory chemistry: A mixed method analysis of four strategies. *Journal of Chemistry Education.*

Conference Papers

K-12 science and engineering education

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

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

Thompson, M., Sheldon, J., Kamarainen, A., Moriarty, M.. (2016). *Viewpoints on Experimentation from the Perspectives of Teachers and Students.* Related paper set

submitted to the National Association of Research on Science Teaching (NARST), Balitmore, MD. April 2016.

Moriarty, M., DeRosa, D., Thompson, M.. (2016). *Authentic Scientific Research Experiences (ASREs) influence on teachers' ideas about experimentation, observation, and the Nature of Science (NOS).* Related paper set submitted to the National Association of Research on Science Teaching (NARST), Balitmore, MD. April 2016.

Thompson, M.M., Tutwiler, M.S., Metcalf, S.J., Kamarainen, A.M., Tut., Grotzer, T.A, Dede, C.J. (2016) *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. April, 2016

Metcalf, S.J., Kamarainen, A.M., Thompson, M.M., Sedney, P.J., Grotzer, T.A, Dede, C.J. (2016) *Ecosystem Science Learning Through Simulated Experimentation Within an Immersive Virtual Environment*. Presented at the annual meeting for the American Education Research Association (AERA), Washington, DC. April, 2016

Metcalf, Shari, Kamaranien, Amy, Tutweiler, Shane M., Thompson, Meredith M., Poldsam, Helen, Grotzer, Tina, Dede, Christopher. (2015) *Augmented reality enhanced field trips for ecosystems science.* Paper presented at the American Educational Research Association (AERA) Chicago, IL. April 2015.

Wallace, A., Thompson, M., Turkay, S. (2016). *MUVES in Online Professional Development for Teachers.* Paper acceted to the Society for Information Technology and Teacher Education (SITE) Conference Atlanta GA. March 2016.

Thompson Knight, M. (2009). Sharing a passion for science: Local student returns to bring new DNA technology to Malden High. *The Malden Observer.* February 19, 2009. http://www.wickedlocal.com/malden/news/x1802692213/Sharing-a-passion-for-science-Local-student-returns-to-bring-new-DNA-technology-to-Malden-High

Thompson Knight,. M & Perito, D. (2008, March). *Using microarrays in the classroom: An array of possibilities.* Paper presented at the National Science Teachers Association (NSTA), Boston, MA.

Thompson Knight, M. & Cyr, M. (2007, June). *Engineering in the classroom: Teacher's strategies for assessing open-ended engineering design projects.* Women in Engineering Programs and Advocates Network (WEPAN), Lake Buena Vista, FL.

Reisberg, R., Ziemer, K.S., Thompson Knight, M., Wong, P., Swan, A., Erkut, S., & Camesano, T. (2006, June). A model STEM collaboration: Four Schools for Women in Engineering (WIE).*Women in Engineering ProActive Network (WEPAN).* Pittsburgh, PA.

Thompson Knight, M., & Cunningham, C. (2004, June). *Draw an Engineer Test (DAET): Development of a tool to investigate students' ideas about engineers and engineering.* Paper presented at the American Society for Engineering Education (ASEE) Annual Conference and Exposition, Salt Lake City, UT.

Undergraduate science and engineering education

Thompson M., Allen, E. Talbott, R, Garik, P. (2015, April). *Next Generation Course Transformation.* Related Paper Set presented at the National Association of Research on Science Teaching (NARST), Chicago, IL.

Thompson M, Garik, P. (2015, April). *The impact of Learning Assistants on learning outcomes and satisfaction in large enrollment courses.* Paper presented at the National Association of Research on Science Teaching (NARST), Chicago, IL.

Thompson M, Braude, E., Canfield, C, Halfond, J, Sengupta, A. (2015, March). *Assessment of KNOWLA: Knowledge Assembly for Learning and Assessment.* Work in Progress Paper presented Learning At Scale Vancouver, BC.

Thompson M, Lin, T. W.J, and Popejoy, K. (2014, March). *Peer teachers in large STEM courses: Comparison of three models from North America.* Paper presented at the National Association of Research on Science Teaching (NARST), Pittsburgh, PA.

Thompson M, Garik. P., Spilios, K., (2014, March). *Insight into involvement: Perspectives from peer educators.* Paper presented at the National Association of Research on Science Teaching (NARST), Pittsburgh, PA.

Thompson Knight, M., Garik, P., Moser, A., Hammond, N., Jariwala, E. M., Spilios, K., Goldberg, B. (2013, April). *Investigating the effect of peer teachers on learning environments in large STEM courses.* Paper presented at the National Association of Research on Science Teaching (NARST), Rio Grande, Puerto Rico.

Thompson Knight, M., Fortin, P., Adams, K., & Lipton, P.A. (2013, April). *Preparing undergraduates for research experiences through laboratory courses.* Poster presented at the National Association for Research on Science Teaching (NARST). San Juan, Puerto Rico.

Duffy, A., & Thompson Knight, M. (2013, July). *Using Piazza in an Introductory Physics Course.* Paper presented at the American Association of Physics Teachers (AAPT), Portland, OR.

Hammond, N., Spilios, K., Jariwala, E. M., & Thompson Knight, M. (2013, April). *Improving educational outcomes through Learning Assistants.* Paper presented at the National Science Teachers Association (NSTA), San Antonio, TX.

Jariwala, E. M., & Thompson Knight, M. (2013, January). *Perceived effect of Teaching Fellows (TFs) and Learning Assistants (LAs) on course success.* Paper presented at the American Association of Physics Teachers (AAPT), New Orleans, LA.

Jariwala, E.M., Thompson Knight, M., Spilios, K., Duffy, A., Greenman, M. Goldberg, B., Hunt, T., Knaub, A., Garik, P., Lipton, P., Farny, C., Bassina, N., Abrams, B., Dill, D. (2013, March). *Tracing the explosive growth of the Learning Assistant program and its transformative impact on STEM education at Boston University.* Paper presented at the Center for Excellence and Innovation in Teaching (CEIT) conference, Boston University, Boston, MA.

Dombach, M., Knight, M., & Rogers, C. (2007). *Teaching seniors through developing multidiscilinary academies.* Paper presnted at the Proceedings of CCLI conference, The Power of Interdisciplinary/ Multidisciplinary Courses and Curricula.

Presentations

Invited presentations

Thompson Knight, M., Jariwala, E. M., & Spilios, K. (2012). *Teaching as research.* Paper presented at the Center for Excellence and Innovation in Teaching (CEIT) Teaching Talks, Boston University. April 12, 2012.

Thompson Knight, M., Lamanna, A., & Mier, L. (2013). *When doing it right means getting it wrong: The promise and perils of group work.* Paper presented at the Center for Excellence and Innovation in Teaching (CEIT) Teaching Talks, Boston University. January 18, 2013.

Fellowships, Grants and Honors

AERA Applied Research in Immersive Environments for Learning SIG Best Paper Award April 2015, American Educational Research Association (coauthored).

Helen and James C. Hennelly Family Scholarship, Boston University, 2013. Competition for Boston University female students 30 and above. Scholarship awarded on the basis of academic promise and financial need. Awarded $1,000.

Glenn Fellowship, 2011-present. Fellowship awarded to candidates who have demonstrated the capability to engage in a career in academics which can include, but is not limited to, teaching, managing research projects, and relevant service to the school, university, community, and profession. Awarded full tuition, 4 years, plus 9-month stipend (~$120,000).

Selected Other Professional Activities

Scholarly article, manuscript, and grant proposal review:
National Association for Research in Science Teaching (NARST) Conference;
Journal of Women and Minorities in Science and Engineering.

Membership:
American Association for Public Opinion Research (AAPOR)
National Science Teachers Association (NSTA)
National Association for Research in Science Teaching (NARST)

University Teaching

Mixed Methods Research Design (GH 706), Harvard Medical School.

> Description: One of three directors for a seminar course designed to introduce medical doctors in the Global Health Program to mixed methods research. Designed presentations and activities including a weekly practical laboratory course to cover topics of research design such as conducting focus groups, designing surveys, determining sample size, selecting theoretical frameworks, creating a logic model, and using research software.

Introduction to Science, Technology, Engineering and Mathematics (STEM) Education: Theory and Practice (SC 521), Boston University.

> Description: A seminar course designed to introduce science majors to research-based pedagogical methods to support their work as peer teachers (Learning Assistants) in large introductory science and engineering courses. Seminar format, 13-20 students in the class. Facilitated class discussions, observed students in classes and provided feedback, read and commented on students' weekly written "teaching reflections."

From the Big Bang to Humankind (cross listed: CHE 6/PHY 6/BIO 6), Tufts University (Teaching Assistant)

> Description: An interdisciplinary lecture course for 100-140 non-science majors starting with the origin of the universe, the formation of the solar system and Earth, the beginning of life on Earth, the evolution of multi-cellular organisms, and the evolution of *homo sapiens*. Coordinated course, helped write and format exams, conducted review sessions, graded papers.

Skills

Qualitative methods – including interviews, focus groups, analysis of data using MaxQDA, Nvivo, HyperResearch, NUD*IST, and ATLAS.ti.

Quantitative methods – including software packages SPSS and R. Statistical techniques including structural equation modeling (SEM), exploratory factor analysis (EFA), confirmatory factor analysis (CFA) using AMOS and MPlus. Extensive knowledge of survey research methodology gained from coursework and book project.

Social network analysis – using UCINet, NetDraw, R programming language, and NodeXL.

Geographic Information Systems – QGIS.

Community Service

Education Research Volunteer, Community Boat Building, Boston MA, 2015-present.

Education Committee Co-Chair, Gloucester Marine Genomics Institute (GMGI), 2015-present.

Member of the Board, Winchester Boat Club, 2014-present.

Elementary school science lesson developer and presenter. Lincoln Elementary School, Winchester MA, 2010-2015.

Steering committee, Lincoln Elementary School Math Mania STEM activity night, Winchester MA, 2013, 2014, 2015, chair of steering committee 2016.

Principal search committee, Lincoln Elementary school, Winchester MA, Jan.-Mar. 2014.

Elementary school science lesson developer and presenter. West Somerville Neighborhood School, 2009-2010.

Pre-school science curriculum developer and presenter. Winchester Cooperative Nursery School (WCNS), 2008-2011.

Cambridge Science Festival, developer and presenter of interactive program on the science of sound, “Soundscience Fun” April 2010, 2011, 2012, 2013, 2014, 2015, 2016.