

# Matthew J. Kloser

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Work Address  
107 Carole Sandner Hall  
Notre Dame, IN 46556  
mkloser@nd.edu

## EDUCATIONAL BACKGROUND

ORCID: 0000-0002-4902-9854

- 2011 – 2012 Post-Doctoral Scholar  
Stanford University, Center to Support Excellence in Teaching  
Pam Grossman, Advisor
- 2011 Ph.D., Science Education  
Stanford University, Stanford, CA
- 2010 M.S., Biology  
Stanford University, Stanford, CA
- 2004 M.Ed.  
University of Notre Dame, Notre Dame, IN
- 2002 B.A., History and Pre-Professional (Pre-Medicine) Studies  
University of Notre Dame, Notre Dame, IN

## PROFESSIONAL APPOINTMENTS

- 2018 – Present Associate Professor of the Practice  
Institute for Educational Initiatives, University of Notre Dame
- 2012 - Present Director, Notre Dame Center for STEM Education  
Institute for Educational Initiatives, University of Notre Dame
- 2012 - 2018 Assistant Professor of the Practice  
Institute for Educational Initiatives, University of Notre Dame
- 2004 – 2007 Assistant Program Director, ACE M.Ed.  
Notre Dame, IN
- 2002 – 2007 High School Science and Mathematics Teacher  
Birmingham, AL; South Bend, IN

## RESEARCH PROJECTS & GRANTS

- 2020 - Present     *SPIRAL: Supporting Professional Inquiry and Re-Aligning Learning through a structured e-portfolio system.*  
Co-PI  
National Science Foundation (DRK-12), \$1,500,000
- 2019 - Present     *Interruptions and Meaningful Multi-media Experiences Research in Science Education (IMMERSE)*  
PI  
Howard Hughes Medical Institute, \$124,000
- 2016 – Present     *Investigating the Impact of Longitudinal Core Practice Professional Development on STEM Teaching Practice*  
PI  
Trustey Family/Sweeney Family Gifts, \$2,500,000 (Program & Research)
- 2015 - 2019        *Attention-Aware Cyberlearning to Detect and Combat Wandering Minds*  
Advisory Board (Sydney D’Mello, PI)  
National Science Foundation (CYBERLEARNING), \$565,000
- 2014 – 2018        *Measuring Next Generation Science Instruction Using Tablet-Based Teacher Portfolios*  
Co-PI  
National Science Foundation (REAL), \$1,800,000
- 2014 – 2017        *Improving Teachers’ Use of Data for Instructional Decisions: Using Assessment Portfolios for Professional Development*  
PI  
Spencer Foundation; \$300,000
- 2014 – 2017        *Investigating Core Teaching Practices Across Disciplines*  
Research Faculty (Housed at Stanford)  
Sponsor: Bill and Melinda Gates Family Foundation; \$400,000
- 2013 – 2016        *Investigating the Impact of an Organizational Change from a K-8 Catholic School to a STEM Academy*  
PI  
IEI (Notre Dame) Seed Grant; \$5,000
- 2010 – 2011        Impact of Text Type on High School Biology Learning  
PI  
Stanford Dissertation Support Grant; \$6,000

## TEACHING & SUPERVISION

### University Teaching Experience

- 2012 – Present     Science Education Policy, Values, and Practices (ESS 30623)
- 2014 – Present     Seminar in Educational Research, ESS Capstone (ESS 43640)
- 2006 – Present     Science Methods I & II (EDU 60685/60785 - Graduate Level)  
Assessment in Science Education (EDU 60795 - Graduate Level)  
University of Notre Dame, Notre Dame, IN
- 2004 – 2007        Introduction to Teaching (EDU 60020 - Graduate Level)  
University of Notre Dame, Notre Dame, IN

### Teaching Assistantships

- 2008 – 2009        Curriculum & Instruction in Science (EDUC 267B&C)  
STEP Program, Stanford University, Stanford, CA
- 2008                Communicating Science (GES 218)  
Stanford University, Stanford, CA

### Mentoring and Supervision of Teaching

- 2011 – 2012        Beginning Teacher Support and Assessment (BTSA) Mentor  
Silicon Valley/Stanford University New Teacher Project
- 2007 – 2008        Field Supervisor for High School Science Teachers  
STEP Program, Stanford University, Stanford, CA

## PUBLICATIONS

### **Refereed Journals**

- Kloser, M., Borko, H., Wilsey, M., & Rafanelli, S. (2022). Leveraging portfolios in professional development for middle school science teachers' assessment and data-use practice. *Science Education*, 106(4), 924-955.
- Martinez, J-F., Kloser, M., Srinivasan, J., Stecher, B., & Lavin, E. (2022). Developing situated measures of science instruction through an innovative electronic portfolio app for mobile devices: Reliability, validity, and feasibility. *Educational and Psychological Measurement*.
- Kloser, M., Martinez, J-F., Stecher, B., Edelman, A., Floyd, C., Srinivasan, J. (2020). Interrogating practice or 'show-and-tell'? Lessons learned from a digital-portfolio based PLC, *Journal of Science Teacher Education*. doi: [10.1080/1046560X.2020.1808267](https://doi.org/10.1080/1046560X.2020.1808267)

- Wilsey, M., Kloser, M., Borko, H., & Rafanelli, S. (2020). Influences of professional development on middle school science teachers' mental models of assessment practice. *Educational Assessment, 25*(2), 136-158.
- Kloser, M., Wilsey, M., Madkins, T., & Windschitl, M., (2019). Connecting the dots: Linking frameworks for facilitating discussion to novice teacher practice. *Teaching and Teacher Education, 80*, 115-127.
- Kloser, M., Wilsey, M., Immonen, A., Navotas, A., & Twohy, K. (2018). "We do STEM": Unsettled conceptions of STEM education in middle school STEM classrooms. *School Science and Mathematics, 118*(8), 335-347.
- Kloser, M., Wilsey, M., Hopkins, D., Dallavis, J. W., Lavin, E., & Comuniello, M. (2017). Dual identities: Organizational negotiation in STEM-focused Catholic schools. *Cultural Studies in Science Education, 13*, 549-579.
- Davis, E., Kloser, M., Windschitl, M., Wells, A., Carlson, J., & Marino, J-C. (2017). Teaching the practice of leading sense-making discussions in science: Using rehearsals, *Journal of Science Teacher Education, 28*(3), 275-293.
- Kloser, M., Borko, H., Martinez, F., Stecher, B., & Luskin, R. (2017). Evidence of middle school science assessment practice from classroom-based portfolios, *Science Education, 101*(2), 209-231.
- Kloser, M. (2016). Alternate text types and student outcomes: An experiment comparing traditional textbooks and more epistemologically considerate texts, *International Journal of Science Education, 38*(16), 2477-2499.
- Kloser, M. & Wilsey, M. (2015). No blue ribbon: Reforming science fairs in middle and high school science education, *The Science Teacher, 82*(8).
- Kloser, M. J. & Brownell, S. E. (2015). Toward a conceptual framework for measuring the effectiveness of course-based undergraduate research experiences in undergraduate biology. *Studies in Higher Education, 1 – 20*.
- Kloser, M. (2014). Identifying a core set of science teaching practices: A Delphi expert panel approach. *Journal of Research in Science Teaching, 51*(9), 1185 – 1217.
- Kloser, M. & Bofferding, L. (2014). Middle and high school students' conceptions of climate change mitigation and adaptation strategies. *Environmental Education Research*.
- Brownell, S., Kloser, M., Fukami, T., & Shavelson, R. (2013). Context matters: Volunteer bias, small sample size, and the value of comparison groups in the assessment of research-based undergraduate introductory biology lab courses. *Journal of Microbiology and Biology Education, 14*(2), 176 – 182.

- Kloser, M. (2013). Exploring high school biology students' engagement with more and less epistemologically considerate texts. *Journal of Research in Science Teaching*, 50(10), 1232 – 1257.
- Kloser, M., Brownell, S., Fukami, T., & Shavelson, R. (2013). Effects of a research-based ecology lab course: A study of non-volunteer achievement, self-confidence and perception of lab course purpose. *Journal of College Science Teaching*, 42(3), 72 – 81.
- Kloser, M. (2012). A place for the nature of biology in biology education. *Electronic Journal of Science Education*, 16(2), 1-21.
- Martinez, J. F., Borko, H., Stecher, B., Luskin, R., & Kloser, M. (2012). Measuring quality assessment in science classrooms through artifacts and self-report. *Educational Assessment*, 17(2-3), 107-131.
- Kloser, M. & Brownell, S., Shavelson, R., & Fukami, T. (2012). *Journal of College Science Teaching*. Undergraduate biology lab courses: Comparing the impact of traditionally-based 'cookbook' and authentic research-based courses on student lab experiences, 41(4), 36-45.
- Kloser, M., Brownell, S., Chiariello, N., & Fukami, T. (15 November 2011). *PLOS Community Pages*. Integrating teaching and research in undergraduate biology laboratory education, 9(11).
- Brown, B. & Kloser, M. (2009). Conceptual continuity and accessing everyday scientific understandings. *Cultural Studies in Science Education*, 4, 875-897.
- Brown, B. & Kloser, M. (2009) A view of the tip of the iceberg: revisiting conceptual continuities and their implications for science teaching. *Cultural Studies in Science Education*, 4, 921-928.

### **Books, Book Chapters, and Invited Reports**

- Kloser, M. & Windschitl, M. (2020). Comparing pedagogies in two secondary methods courses. In *Preparing science teachers through practice-based teacher education*, D. Stroupe, K. Hammerness, S. McDonald (Eds.). Cambridge, MA: Harvard Education Press.
- Kloser, M. & Windschitl, M., (2019). Scaffolds, tools, and disciplined improvisation. In *Sensemaking in Elementary Science*, E. Davis, C. Zembal-Saul, S. M. Kademian (Eds.). New York, NY: Routledge.
- Kloser, M. (2018). *The nature of the teacher's role in supporting student investigations in middle and high school science classrooms: Creating and participating in a community of practice*. A report commissioned by the National Academies of Sciences, Engineering, and Medicine. Washington D.C.

- Kloser, M. and Troy, S. (2018). *Reading nature: Engaging biology students with evidence from the living world*. Arlington, VA: NSTA Press.
- Kelly-Peterson, M., Davis, Ghouseni, H., Kloser, M., and Monte-Sano, C. (2018). Rehearsals as approximations of practice. In P. Grossman and M. Franke (Eds), *Teaching core practices in teacher education*. Cambridge, MA: Harvard Education Press.
- Rafanelli, S., Borko, H., Kloser, M., Wilsey, M. (2018). From focusing on grades to exploring student thinking: A case study of change in assessment practice. In Fives, H. and Barnes, N. (Eds) *Data use*. London: Routledge.
- Brown, B., Henderson, B., & Kloser, M. (2012). Bridging cultures: The role of culturally-relevant pedagogy, discursive identity, and conceptual continuities in the promotion of scientific literacy. In Moore, J. L. III and Lewis, C. W. (Eds.) *Urban school contexts for African American students: Crisis and prospects for improvement*. New York: Peter Lang Publishers.
- Kloser, M. (2007). From Warsaw to Birmingham: The making of a teacher. In J. Watzke (Ed.), *Beyond Alternative Education*. Notre Dame, Indiana: ACE Press.

### **PRESENTATIONS/PROCEEDINGS**

- Oz., E. and Kloser, M. (2022). Middle school students' understanding of and interest in STEM-related careers. *A Paper for the Annual Meeting of the American Educational Research Association*. San Diego, CA.
- Kloser, M., Szopiak, M., Wagner, C. (2022). Effects of pedagogical interruptions on secondary student interest, engagement, and comprehension of narrative science videos. *A Paper for the National Association of Research in Science Teaching*. Vancouver, Canada.
- Kloser, M. (2021). Applying an equity framework to STEM Contexts. *A Presentation for the Making STEM a Force for Good: Excellence in Teaching Conference*. Virtual Conference.
- Kloser, M., Szopiak, M., & Wagner, C. (2021). A storied discipline: Exploring a place for narrative in science education. *A Paper for the National Association of Research in Science Teaching*. Virtual Conference.
- Oz, E. and Kloser, M. (2021). Motivational factors mediating attitudes toward STEM careers amongst a national sample of middle school students. *A Paper for the National Association of Research in Science Teaching*. Virtual Conference.
- Oz, E. and Kloser, M. (2021). Middle school students' motivational dispositions and STEM career attitudes. *A Paper for the Annual Meeting of the American Educational Research Association*. Virtual Conference.

- Doan, S. Kaufman, J.H., Kloser, M.J., Schweig, J.D., & Tekkumru-Kisa, M. (2021). What do science teachers know about three-dimensional science standards and why does it matter? *A Paper for the Annual Meeting of the American Educational Research Association*. Virtual Conference.
- Kloser, M., Wilsey, M., Oz, E. (2020). Middle Grade STEM Teachers' Conceptions and Prioritization of Core Instructional Practices Over Time. *A Paper for the Annual Meeting of the National Association of Research in Science Teaching*. Orlando, FL. [Cancelled due to COVID-19]
- Silla, E., & Hornburg, C. B., Kloser, M., & McNeil, N. M. (2020). Research-based teaching practices for improving students' understanding of mathematical equivalence have not made it into elementary classrooms. In S. Denison, M. Mack, Y. Xu, & B. C. Armstrong (Eds.), *Proceedings of the 42nd Annual Conference of the Cognitive Science Society*. Austin, TX: Cognitive Science Society.
- Wilsey, M. and Kloser, M. (2020). Changes in middle school S.T.E.M. teachers' drawn mental models of STEM education over time. *A Paper for the Annual Meeting of the National Association of Research in Science Teaching*. Orlando, FL. [Cancelled due to COVID-19]
- Kloser, M., Martinez, J-F., Stecher, B., Edelman, A., Floyd, C., Srinivasan, J. (2019). Interrogating practice or 'show-and-tell'? Lessons learned from a digital-portfolio based PLC. *A Paper for the Annual Meeting of the National Association of Research in Science Teaching*. Baltimore, MD.
- Kloser, M., Borko, H., Wilsey, M., & Rafanelli, S. (2018). Leveraging portfolios in professional development for middle school science teachers' assessment and data-use practice. *A Paper for the Annual Meeting of the American Educational Research Association*. New York, NY.
- Kloser, M., Wilsey, M., Madkins, T., Windschitl, M., Wells, A., Carlson, J., & Davis, B. (2018). Connecting the dots: Secondary science teacher candidates' uptake of facilitating discussions from teacher education experiences. *A Paper for the Annual Meeting of the National Association of Research in Science Teaching*. Atlanta, GA.
- Martinez, J. F., Stecher, B., & Kloser, M. (2018). Measuring instruction using classroom artifacts and portfolios: Evidence from four recent studies. *A Symposium for Annual Meeting of the National Council on Measurement in Education*. New York, NY.
- Rafanelli, S., Borko, H., Kloser, M., & Wilsey, M. (2018). Science teachers' changing assessment practices: Case studies of individual change through PD and professional collaboration. *A Paper for the Annual Meeting of the National Association of Research in Science Teaching*. Atlanta, GA.
- Rafanelli, S., Borko, H., Kloser, M., & Wilsey, M. (2017). From focusing on grades to exploring student thinking: A case study of change in assessment practice. *A Paper for the Annual Meeting of the American Educational Research Association*. San Antonio, TX.

- Kloser, M., Gottlieb, J., Wilsey, M., Svarovsky, G. N., Kirkland, P., & Puricelli, J. (2017). Exploring the relationship among middle grade teacher's conceptions of STEM and equity. *A Paper for the Annual Meeting of the National Association of Research on Science Teaching*. San Antonio, TX.
- Martinez, F., Riedell, K., Rocchio, R., Srinivasan, J., Kloser, M., Wilsey, M., & Stecher, B. (2016). Next generation tablet e-portfolio tool for documenting and reflecting on instructional practice: Possibilities for teacher evaluation and development. *A Paper for the Annual Meeting of the European Association for Research on Learning and Instruction*. Oslo, Norway.
- Kloser, M., Borko, H., Wilsey, M., & Rafanelli, S. (2016). Science teachers' use of data for instructional decisions: Mental models of middle school science assessment practice. *A Paper for the Annual Meeting of the National Association of Research for Science Teaching*. Baltimore, MD.
- Kloser, M., Wilsey, M., Hopkins, D., Dallavis, J., Lavin, E., & Comuniello, M. (2016). Dual identities: Toward a framework for STEM-focused Catholic schools. *A Paper for the Annual Meeting of the National Association of Research for Science Teaching*. Baltimore, MD.
- Davis, B., Kloser, M., Windschitl, M., Wells, A., & Carlson, J. (2016). Teaching the practice of leading sensemaking discussions in science: Using rehearsals. *A Paper for the Annual Meeting of the American Education Research Association*. Washington DC.
- Martinez, J. F., Kloser, M., Srinivasan, J., Riedell, K., Stecher, B., Rocchio, R., Wilsey, M., & Tangmunarunkit, H. (2016). A tablet-based teacher e-portfolio tool for documenting and reflecting on next generation science instruction. *A Paper for the Annual Meeting of the American Education Research Association*. Washington DC.
- Kloser, M., Borko, H., Martinez J. F., Stecher, B., & Luskin, R. (2014). Portraits of assessments: The intended and enacted assessments in middle school science classrooms. *A Paper for the Annual Meeting of the National Association of Research for Science Teaching*. Pittsburgh, PA.
- Core Practice Consortium. (2014). Enriching research and innovation through the specification of professional practice: The Core Practice Consortium. Presidential Session. *A Paper for the Annual Meeting of the American Educational Research Association*. Philadelphia, PA.
- Kloser, M. (2013). A Different Common Core: An Expert Delphi Study on Core Science Teaching Practices. *A Paper for the Annual Meeting of the National Association of Research for Science Teaching*. Puerto Rico.



- Kloser, M. & Bofferding, L. (2013). Middle and High School Students' Responses to Climate Change: The Conflation of Mitigation and Adaptation. *A Paper for the Annual Meeting of the National Association of Research for Science Teaching*. Puerto Rico.
- Kloser, M. (2013). A Different Common Core: An Expert Delphi Study on Core Science Teaching Practices. *A Paper for the Annual Meeting of the American Educational Research Association*. San Francisco, CA.
- Kloser, M. & Bofferding, L. (2013). Middle and High School Students' Responses to Climate Change: The Conflation of Mitigation and Adaptation. *A Paper for the Annual Meeting of the American Educational Research Association*. San Francisco, CA.
- Martinez, J. F., Borko, H., Stecher, B., Luskin, R., & Kloser, M. (2013). Measuring the Classroom Environment through Student Surveys: Methodological, Conceptual and Policy Issues. *A Paper for the Annual Meeting of the American Educational Research Association*. San Francisco, CA.
- Kloser, M. (2012). Formative assessment in science and math classrooms. *Invited Presenter for the Notre Dame Forum on K-20 STEM Education*.
- Kloser, M. (2012). Performance assessments and science education. *Invited Presenter for the Spring Knowles Science Teaching Fellows Meeting*. Los Angeles, CA.
- Kloser, M. (2012). Comparative interactions of high school biology students engaging textbook accounts and narratives of historical experiments. *A Paper for the Annual Meeting of the National Association of Research for Science Teaching*. Indianapolis, IN.
- Martinez, J. F., Borko, H., Stecher, B., Luskin, R., & Kloser, M. (2011). Measuring quality assessment in science classrooms through artifacts and self-report. *A Paper for the Annual Meeting of the American Educational Research Association*. New Orleans, LA.
- Kloser, M. & Brownell, S. (2011). Comparing outcomes of traditional 'cookbook' versus single-question, open-ended undergraduate biology labs. *A Poster Presentation for the Annual Meeting of the National Association for Research in Science Teaching*. Orlando, FL.
- Kloser, M. (2010). The unique nature of biology and its implications for biology education. *A Paper for the Annual Meeting of the National Association for Research in Science Teaching*. Philadelphia, PA.
- Kloser, M. (2010). I earned an "A" in Spanish, but got lost in Spain: Why performance assessments matter for student learning. *A Presentation for the Annual GEOTech Conference*. Dallas, TX.
- Kloser, M. (2009). Teaching evolution. *A Presentation for the Annual Meeting of the National Catholic Education Association*. Anaheim, CA.

## CONSULTING & ADVISORY BOARDS

- 2018 – Present    Advisory Board, *Intelligent diagnostic assessment platform for high school statistics*. (IES Grant – Cheng, Y., PI)
- 2017 – Present    Advisory Board, *Exploring differences between instructors' exams and how these differences produce scores that could inaccurately and inequitably represent student understanding*. (NSF Grant – Brownell, S., PI)
- 2017 – Present    Project S.I.M.P.L.E. Consultant
- 2017                Pew Research Survey Consultant on STEM Education
- 2015 – 2017        Advisory Board, *Illuminating the black box: Using consensus in student survey reports as an indicator of instructional microclimates in mathematics and science*. (NSF Grant – Schweig, J., PI)

## SERVICE AND AWARDS

### Service

- 2020 – Present    *JRST* Editorial Board
- 2012 – 2020        NARST Strand 1 & 4 Conference Proposal Reviewer
- 2016 – 2017        Department of Biological Sciences Introductory Biology Redesign Committee
- 2016 – 2017        Intellectual Virtues Planning Committee (Templeton Grant)
- 2012 – 2016        Indiana STEM Education Advisory Board
- 2014 – 2016        Orthoworx Education Council Board Member
- 2012 – 2015        Committee Member, NARST Early Career in Research Award
- 2010 – 2011        Committee Member, Stanford School of Education Dean Search Committee  
Stanford Office of the Provost

### Ad Hoc Journal/Grant Reviewer

*AERJ*

*Cultural Studies in Science Education*

*Education Evaluation and Policy Analysis*

*Educational Researcher*

*International Journal of Science Education*

*Journal of Research in Science Teaching (Editorial Board)*

National Science Foundation

*Science Education*

Spencer Foundation

Conference Proposal Reviewer

AERA 2011 – Present

JRST 2011 - Present

**Awards**

- 2015 JRST Outstanding Paper Award  
National Association for Research in Science Teaching
- 2014 ‘Research Worth Reading’ Selection  
National Association of Research in Science Teaching
- 2011 NARST Outstanding Dissertation Research Award Finalist  
National Association for Research in Science Teaching
- 2011 NARST Conference Outstanding Paper Award  
National Association for Research in Science Teaching
- 2010 Gerald J. Lieberman Fellowship
- 2004 Master of Education Commencement Speaker  
University of Notre Dame
- 2004 Theodore Ryken Award for Teaching and Service  
Holy Family High School, Birmingham, AL
- 2002 Summa cum Laude  
University of Notre Dame
- 2002 Phi Alpha Theta, History Honor Society  
University of Notre Dame
- 1998 – 2002 Lilly Scholar  
University of Notre Dame

**PROFESSIONAL ORGANIZATIONS**

- 2009 – Present National Association for Research in Science Teaching
- 2008 – Present American Educational Research Association
- 2012 – 2020 National Science Teachers Association
- 2005 – 2006 Association for Supervision and Curriculum Development