# THOMAS R. TRETTER

*updated April 24, 2019*


**ADDRESS**

Department of Middle & Secondary Education (502) 852-0595
University of Louisville tom.tretter@louisville.edu
Louisville, KY 40292


## EDUCATION

1998-2004 **Ed.D., Curriculum and Instruction**, from the University of North Carolina at Chapel Hill. Focus on secondary science education. Dissertation title: "*Conceptions of Scale and Scaling: The Expert-Novice Continuum*" under the direction of Dr. M. Gail Jones, North Carolina State University, Raleigh, North Carolina.

1992-1995 **Teaching Certification** in physics and secondary mathematics, University of South Carolina, Columbia, South Carolina.

1986-1987 **Masters of Science in Electrical Engineering**, California Institute of Technology, Pasadena, California. Concentration on control systems.

1982-1986 **Bachelors of Science in Electrical Engineering** and **German Translator's Certificate**, *summa cum laude*, Rose-Hulman Institute of Technology, Terre Haute, Indiana.

## RESEARCH & TEACHING POSITIONS

2015-present **Director**, Center for Research in Mathematics and Science Teacher Development (CRIMSTED), University of Louisville.

2014-present **Professor of Science Education**, Department of Middle & Secondary Education, University of Louisville, Louisville, Kentucky.

2010-present **Director**, Gheens Science Hall & Rauch Planetarium at U. of Louisville.

2009-2014 **Associate Professor of Science Education**, Department of Middle & Secondary Education, University of Louisville, Louisville, Kentucky.

2010, July 1 **Tenure** awarded at University of Louisville.

2004-2009 **Assistant Professor of Science Education**, Department of Teaching and Learning, University of Louisville, Louisville, Kentucky.

2003-2004 **Instructor – M.Ed. for experienced teachers**, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

2001 **Instructor – Mentor Teacher**, Duke University Master of Arts in Teaching program, Durham, North Carolina.

2001-2003 **Mathematics Teacher**, The Governor's School of North Carolina, Raleigh, North Carolina. (gifted program for high school seniors)

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| 1997-2001 | **AP Physics, Physics, Physical Science, and Statistics Teacher**, Southern High School, Durham, North Carolina. |
| 1995-1997 | **Mathematics Teacher**, Khartoum American School, Khartoum, Sudan, Africa. |
| 1992-1995 | **Mathematics Teacher**, Lower Richland High School, Columbia, South Carolina. |
| 1990 | **Peace Corps Trainer**, United States Peace Corps, Libreville, Gabon, Africa. |
| 1988-1990 | **Mathematics Teacher**, Lycée Technique de Moanda, Gabon, Africa. |
| 1987 | **Teaching Assistant**, California Institute of Technology, Pasadena, California. |

## DOCTORAL STUDENTS MENTORED

**Dissertation chair/co-chair**:

Art Thacker (2006, August). "Evaluating Successful Teacher Practices in Relation to Overall School Performance on the Kentucky Core Content Test"

Jon Saderholm (2007, August). "Science Inquiry Learning Environments Created by National Board Certified Teachers"

Nikki Votaw (2008, August). "Impact of an Informal Learning Science Camp on Urban, Low Socioeconomic Status Middle School Students and Participating Teacher-Leaders"

Pam Jett (2009, May). "Elementary Teachers' Beliefs and Practices with Formative Assessment in the Science Classroom"

Kim Banta (2010, August). "Principal behavior – the ripple effect: Improving teacher instructional practices through principal-teacher interactions"

Brennon Sapp (2010, August). "Principal behavior – the ripple effect: Improving teacher instructional practices through principal-teacher interactions"

Lynda Redmon (2010, December). "The Oldham County Learning Institute: Strengthening High School and Middle School Teachers' Abilities to Teach their Students Powerful Thinking Strategies"

Yuliya Ardasheva (2010, December). "English Language Learners in Focus: Predictors of English Proficiency and Academic Achievement"

Pamela Royster (2012, May). Putting Time on your Side: A System for Getting All Students on a College-Ready Trajectory

Amber Jaggers (2012, May). Putting Time on your Side: A System for Getting All Students on a College-Ready Trajectory

Stephanie Philipp (2013, August). Strengthening STEM Performance and Persistence: Influence of Undergraduate Teaching Assistants on Entry-Level STEM Students

Bruce Whearty (2013, August). Running Among Thorns: Perspectives on Ethiopian/United States Educational Experiences

Debbie Anderson (2014, December). Scripted vs. other Reading programs for Struggling African-American middle school males

Twyla Harris (2015, May). The Effects of Highly-engaged Field Experiences and Multi-faceted Mentoring Strategies on Ameliorating Pre-service Teacher Concerns
Bill Thornburgh (2017, May). The Role of the Planetarium in Students' Attitudes, Learning, and Thinking about Astronomical Concepts
Roland O'Daniel (2019, May). Creating a College-going Culture: Accountability Models and Measuring Institutional Rigor in Secondary Schools
Melissa Michael (2019, August). Investigating the Nature of Teacher Collaboration during a Structured, Video-supported Professional Development of High School Biology Teachers through Activity Theory Framework

Ferrel (Bo) Lowrey (in progress). Topic to be developed
Terri Tinnel (in progress). Topic to be developed
Jessie Newhouse (in progress). Topic to be developed
Breanna Ausbrooks (in progress). Topic to be developed
Mary Mills (in progress). Topic to be developed
Matt Trzaskus (in progress). Topic to be developed
Tricia Shelton (in progress). Topic to be developed
Cynthia Thomas (in progress). Topic to be developed

**Dissertation committee member**

Chuck Fidler (2009, May). Syracuse University.
Nate Mitchell (2009, August).
Yung-Chou (Enzo) Chen (2010, May)
Terry Seitz (2010, December)
Denise Allen (2011, May)
Carol Christian (2011, December)
Yi Li (2012, May – Computer Engineering/Computer Science Master's Thesis)
Sze Sze Tong (2013, May)
Lisa Conn (2013, August)
Nora Honken (2014, May)
Mike Hibbett – (2014, May)
Annette Bridges – (2014, December).
Patrick Riley (2016, August). Western Kentucky University
Winn Wheeler (2016, May).
Rose Glasser (2017, May)

## GRANTS & GIFTS

### Gifts

2018 Planetarium Lobby Exhibits. Cash donated by Reed Gernert to develop additional planetarium lobby exhibits. $3000.

2018 Planetarium Lobby Exhibits. Cash donated by Mary Ann Russell to develop additional planetarium lobby exhibits. $20,000.

2018 Moon Exhibit. Cash donated by Mary Ann Russell to develop and install Moon exhibit in planetarium lobby. $25,000.

2017 Mechanical Star Machine Exhibit. Cash donated by Gernert family to suspend and display original mechanical star machine in planetarium lobby. $2500.

2017 Meteorite Exhibit. Cash and meteorites (100-specimens) donated by Mary Ann and Bill Russell for a planetarium lobby exhibit. $300,000

2014-2017 Planetarium Space Engineering Bootcamp, PI. Four-week after-school camp sponsored by Time Warner Cable for low-income middle school youth. $16,000

2014 Planetarium Space Engineering Camp, PI. Week-long camp partially sponsored by Louisville Metro Councilwoman Hamilton for middle school youth in her district. $5000

2014-2015 Planetarium Field Experiences for Low-Income Students. PI. Private foundation donation to defray cost of planetarium field experiences for low-income schools. $5000

2012-date Whitney Young Scholars Space Engineering Institute. PI. Louisville Gas & Electric (LG&E). $120,000 as of 2019 ($15,000/year) for development and delivery of Space Engineering summer institute for Whitney Young Scholars.

2011-2014 Portable Planetarium Outreach. PI. Private foundations and individuals' gift donations for this planetarium-based initiative to acquire, develop & deliver programming for a new generation portable planetarium for outreach to regional schools. $310,000.

**External Grants**

2019 Astronomy Modeling Workshop for High School Teachers. PI. NASA-Kentucky enhanced mini-grant. $25,000.

2019 Engaging the Public and K-12 Students with Planetarium Space Exhibits. PI. NASA-Kentucky enhanced mini-grant. $25,000.

2019 Immersing K-12 Students in Foundational Astronomy Concepts and Practices. PI. NASA-Kentucky mini-grant. $5000.

2016-2018 FASST: NGSS-Formative Assessment Strategies for Science Teachers. Co-PI. Kentucky Mathematics & Science Partnership Program. $410,000.

2016-2018 ASSESS: Assessments of Science Enabling Successful Students. PI. Kentucky Mathematics & Science Partnership Program. $410,000.

2015-2016 Engaging and Exciting K-12 Students With Visually Immersive Astronomy Experiences. PI. NASA Kentucky Space Grant. $5000.

2013-2016 ADVANC$^3$E: ADvancing Vertical Alignment of the NGSS Core/Cross-Cutting Concept Energy. PI. Kentucky Mathematics & Science Partnership Program. $452,000

2011-2016 Partnership for Retention Improvement in Mathematics, Engineering, and Science (PRIMES) (Award No. DUE-1068301). Co-PI. National Science Foundation. $2,000,000.

2012-2013 Research Initiation Grant: Can Makerspaces Develop Undergraduates' Research Creativity and Innovation? (Award No. EEC-1136708). Co-PI. National Science Foundation, $150,000.

2012-2013 Immersed in Science: Planetarium-based Scientific Visualizations for Middle and High School English Language Learners. PI. The Sutherland Foundation (private foundation). $75,000.

2009-2014 Early Start Noyce STEM Partnership, (Award No. DUE 0934787). Co-PI. National Science Foundation, $900,000

2007-2011 Groundwork Education in Mathematics & Science (GEMS, Award No. DGE-0638579), Christy Rich, PI. My role – Mentor to Fellow/Teacher teams in the physical sciences; National Science Foundation (NSF) Graduate Teaching Fellows in K-12 Education (GK-12) program, $1.8 million for 3 years plus one year extension.

2006-2007 Elementary to Middle Science Program, PI (year 3 only). Year 3 of a Math-Science Partnership grant funded by the Kentucky Dept. of Education, $100,000 (for year 3).

2006-2007 Science Beyond the Classroom, Co-PI. E.on U.S. and G.E. Foundation education outreach grant, $41,000 for 2 years.

2005 Physical Science: Motion and Forces Teacher Academy, PI. Kentucky Department of Education Teacher Academy grant, $60,000.

2004-2007 Scale and Scaling Across the Science Domains, Gail Jones, PI. My role - Project Manager and co-writer; National Science Foundation (NSF) Research on Learning and Education (ROLE) program, $580,000.

2003-2006 Urban University Partnership for Math and Science Teacher II ($U^2$PMAST II) – Bill Bush, PI. My role - Researcher, Physical Science team leader; US Department of Education, $1,200,000.

2002-2006 Louisville Area Science and Mathematics Alliance for Recruitment in Teacher Education Reform (LA-SMARTER) – Robert Ronau, PI. My role – Developed and delivered physics content course to teachers; National Science Foundation (NSF), $850,000.

2003-2004 Handcrafting in the Nanoworld: Building Models and Manipulating Molecules – Mike Falvo, PI. My role - Program evaluation assistant; National Science Foundation Division of Undergraduate Education (DUE) program grant, $100,000.

2002-2004 High Voltage Mathematics Project, Co-PI, Toyota TIME (Toyota's Investment in Mathematics Excellence) and National Council of Teachers of Mathematics, $10,000.

2001-2003 Investigating Viruses with Touch: Nanotechnology and Science Inquiry – Gail Jones, PI. My role - Research Assistant; National Science Foundation (NSF) Research on Learning and Education (ROLE) program grant, $770,000.

**Internal Grants (Institution-based)**

2011-2012 Science Inquiry Centered Argumentation Model (ScICAM) for young English Language Learners: A pilot study, Co-PI. University of Louisville Competitive Enhancement Grant, $15,000.

2006 Critical Thinking of Highly Accomplished Teachers, PI. University of Louisville Intramural Research Incentive Grant, $5000.

2001 Enhancing an Electric Vehicle, Co-PI, Durham public education network, $1200.

2000 Catapult to Comprehension, PI, Durham public education network, $1190.

2000 Electric Vehicle Challenge, Co-PI, Durham public education network, $1200.

2000 Incorporation of CBL Technology in Science, Co-PI, Durham public education network, $1200.

## AWARDS AND HONORS

2019 U. of Louisville College of Education & Human Development Distinguished Faculty Award for Career of Service.

2018 Kentucky Science Teachers Association Sherry Fox Distinguished Science Educator Award. This award is designed to recognize exemplary science leaders across the state of Kentucky who have made significant contributions to science education.

2010 National Association for Research in Science Teaching (NARST) Early Career Research Award (March 2010). "An award given annually to the early researcher who demonstrates the greatest potential to make outstanding and continuing contributions to research in science education."

2008 Kentuckiana Metroversity Award for Instructional Development. Course developed: "Science beyond the Classroom" by Sherri Brown, Thomas R. Tretter, Nikki Votaw, and Beth Brown (October 2008).

2007 Kentuckiana Metroversity Award for Instructional Development. Course developed: "Remote Astronomy for Teachers" by Thomas R. Tretter, John Kielkopf, and Drew Foster (October 2007).

2006 Kentuckiana Metroversity Award for Instructional Development. Course developed: "Physics for Teachers: How Things Work" by Thomas R. Tretter, Sherri Brown and Jeffrey Wright (October 2006).

Best Paper Award in "Women & IT" category, Multimedia Applications in Education Conference (MapEC) International Conference, Graz, Austria, (September 2006).

Outstanding Dissertation Award 2004, National Association for Research in Science Teaching (NARST).

Best Pedagogical Paper, North Carolina Section of the American Association of Physics Teachers, (Spring 2001).

Marvin Wyne Outstanding Student Paper Award for 2000, North Carolina Association for Research in Education.

Teacher of the Year, Southern High School, Durham, NC (2000-2001).

District finalist, Teacher of the Year, Durham Public Schools, NC (2000-2001).

2000 Durham Jaycees Outstanding Young Educator, Durham, NC.

International Schools Services Community Service Award Competition Second Place, Khartoum, Sudan, Africa (1996-1997).

Tau Beta Pi Fellow (nationally competitive engineering honor society fellowship) (1986-1987).

Summa cum laude graduation from Rose-Hulman Institute of Technology, Terre Haute, IN (1986).

Elected to membership in Tau Beta Pi and Eta Kappa Nu (engineering honor societies) (1984).

Chauncey Rose Scholarship at Rose-Hulman Institute of Technology, Terre Haute, IN (1983).

## PUBLICATIONS

### PEER-REVIEWED JOURNALS

**Peer-Reviewed Research Journals**

*Note: * = doctoral student mentee at time of research/publication*

*Tinnell, T., **Tretter, T.**, *Thornburg, W., & Ralston, P. (2019). Successful interdisciplinary collaboration: Supporting science teachers with a systematic, on-going, intentional collaboration between university engineering and science teacher education faculty. *Journal of Science Teacher Education*. doi:10.1080/1046560X.2019.1593086

**Tretter, T. R.**, Ardasheva, Y., Morrison, J. A., & Roo, A. K. (2019). Strengthening science attitudes for newcomer middle school English learners: Visually enriched integrated science and language instruction. *International Journal of Science Education, 41*(8), 1015-1037. doi: 10.1080/09500693.2019.1585993

Ardasheva, Y., & **Tretter, T. R.** (2017). Developing science-specific, technical vocabulary of high school newcomer English learners. *International Journal of Bilingual Education and Bilingualism, 20*(3), 252-271. doi: 10.1080/13670050.2015.1042356

Ralston, P. A. S., **Tretter, T. R.**, & Brown, M. K. (2017). Implementing collaborative learning across the engineering curriculum. *Journal of the Scholarship of Teaching and Learning, 17*(3), 89-108. doi: 10.14434/josotl.v17i3.21323

Philipp, S. B., **Tretter, T. R.**, & Rich, C. V. (2016). Partnership for persistence: Exploring the influence of undergraduate teaching assistants in a gateway course for STEM majors. *Electronic Journal of Science Education, 20*(9), 26-42.

*Honken, N., Ralston, P., & **Tretter, T. R.** (2016). Self-control and academic performance in engineering. *American Journal of Engineering Education, 7*(2), 47-57.

Philipp, S. B., **Tretter, T. R.**, & Rich, C. V. (2016). Undergraduate teaching assistant impact on student academic achievement. *Electronic Journal of Science Education, 20*(2), 1-13. Retrieved from http://ejse.southwestern.edu

Philipp, S. B., **Tretter, T. R.**, & Rich, C. V. (2016). Development of undergraduate teaching assistants as effective instructors in STEM courses. *Journal of College Science Teaching, 45*(3), 74-82.

**Tretter, T. R.**, (2015). Instructional impact on high school physics students' nanoscience conceptions. *Nanotechnology Reviews, (4)*1, 33-50. DOI: 10.1515/ntrev-2014-0015

Ardasheva, Y., Norton-Meier, L. A., **Tretter, T. R.**, & Brown, S. L. (2015). Integrating science and literacy for young English learners: A pilot study, *NYS TESOL Journal, 2*(1), 3-16.

Jones, M. G., Paechter, M., Yen, C-F., Gardner, G., Taylor, A., & **Tretter, T. R.** (2013). Teachers' concepts of spatial scale: An international comparison. *International Journal of Science Education, 35*(14), 2462-2482. doi: 10.1080/09500693.2011.610382

*Ardasheva, Y., & **Tretter, T. R.** (2013). Strategy Inventory for Language Learning—ELL Student Form: Testing for factorial validity. *The Modern Language Journal, 97*(2), 474-489. doi: 10.1111/j.1540-4781.2013.12011.x

*Ardasheva, Y., & **Tretter, T. R.** (2013). Contributions of individual differences and contextual variables to reading achievement of English learners: An empirical investigation using hierarchical linear modeling. *TESOL Quarterly, 47*(2), 323-351. doi: 10.1002/tesq.72

**Tretter, T. R.**, Brown, S. L., Bush, W. S., *Saderholm, J. C., & *Holmes, V. (2013). Valid and reliable science content assessments for science teachers. *Journal of Science Teacher Education, 24*(2), 269-295. doi: 10.1007/s10972-012-9299-7

**Tretter, T. R.**, Jones, M. G., & Falvo, M. R., (2013). Nanoscience for All: Strategies for Teaching Nanoscience to Undergraduate Freshmen Science and Non-Science Majors. *Journal of Nano Education, 5*(1), 70-78. doi:10.1166/jne.2013.1031

*Ardasheva, Y.**,** *Tong, S., & **Tretter, T. R.** (2012). Validating the english language learner motivation scale (ELLMS): Pre-College to measure language learning motivational orientations among young ELLs. *Learning and Individual Differences: A Multidisciplinary Journal in Education, 22*(4), 473-483.

*Ardasheva, Y., & **Tretter, T. R.**, (2012). Perceptions and use of language learning strategies among ESL teachers and ELL students. *TESOL Journal, 3*(4), 552–585.

*Ardasheva, Y., **Tretter, T. R.**, & Kinny, M. (2012). English language learners and academic achievement: Revisiting the threshold hypothesis. *Language Learning, 62*(3), 769–812. doi: 10.1111/j.1467-9922.2011.00652.x

**Tretter, T. R.**, Jones, M. G. & Falvo, M. (2010). Impact of introductory nanoscience course on college freshmen's conceptions of spatial scale. *Journal of Nano Education, 2*, 53-66. doi: 10.1166/jne.2010.1003

*Saderholm, J., & **Tretter, T. R.** (2008). Identification of the most critical content knowledge base for middle school science teachers. *Journal of Science Teacher Education, 19*(3), 269-283. doi: 10.1007/s10972-008-9092-9

Kubasko, D., Jones, M. G., **Tretter, T. R.**, & Andre, T. (2008). Is it live or is it memorex? Students' synchronous and asynchronous communication with scientists. *International Journal of Science Education, 30*(4), 495-514. doi: 10.1080/09500690701217220

Jones, M. G, **Tretter, T. R.,** Taylor, A., & Oppewal, T. (2008). Experienced and novice teachers' concepts of spatial scale, *International Journal of Science Education, 30*(3), 409 - 429. doi: 10.1080/09500690701416624

Jones, M. G., **Tretter, T.**, Paechter, M., Kubasko, D., Bokinsky, A., Andre, T., & Negishi, A. (2007). Differences in African-American and European-American students' engagement with nanotechnology experiences: Perceptual position or assessment artifact? *Journal of Research in Science Teaching, 44*(6), 787-799. doi: 10.1002/tea.20168

**Tretter, T. R.**, Jones, M. G., & Minogue, J. (2006). Accuracy of scale conceptions in science: Mental maneuverings across many orders of spatial magnitude. *Journal of Research in Science Teaching, 43*(10), 1061-1085. doi: 10.1002/tea.20155

Painter, J., Jones, M. G., **Tretter, T. R.**, Kubasko, D. (2006). Pulling back the curtain: Uncovering and changing students' perceptions of scientists. *School Science and Mathematics, 106*(4), 181-190. doi: 10.1111/j.1949-8594.2006.tb18074.x

**Tretter, T. R.**, Jones, M. G., Andre, T., Negishi, A., & Minogue, J. (2006). Conceptual boundaries and distances: Students' and experts' concepts of the scale of scientific phenomena. *Journal of Research in Science Teaching, 43*(3), 282-319. doi: 10.1002/tea.20123

Jones, M. G., Minogue, J., **Tretter, T.**, Negishi, A., & Taylor, R. (2006). Haptic augmentation of science instruction: Does touch matter? *Science Education, 90*(1), 111-123. doi: 10.1002/sce.20086

Jones, M. G., Bokinsky, A., **Tretter, T.**, & Negishi, A. (2005, May 3). A comparison of learning with haptic and visual modalities. *Haptics-e The Electronic Journal of Haptics Research* [Online], 4(0). Available: http://albion.ee.washington.edu/he/ojs/viewarticle.php?id=44

Jones, M. G., Andre, T., Kubasko, D., Bokinsky, A., **Tretter, T.**, Negishi, A., Taylor, R., & Superfine, R., (2004). Remote atomic force microscopy of microscopic organisms: Technological innovations for hands-on science with middle and high school students. *Science Education, 88*(1), 55-71. doi: 10.1002/sce.10112

**Tretter, T. R.**, & Jones, M. G. (2003). Relationships between inquiry-based teaching and physical science standardized test scores. *School Science and Mathematics, 103*(7), 345-350. doi: 10.1111/j.1949-8594.2003.tb18211.x

## Peer-Reviewed Practitioner Journals

**Tretter, T. R.**, & McFadden, J**.** (2018). People as particles: Modeling structure and properties of matter with fifth graders. *Science and Children, 56*(4), 67-73.

Thornburgh, W., & **Tretter, T. R.** (2017). Explaining patterns in our solar system and the role of gravity in space. *Science Scope, 41*(4), 78-86.

Thornburgh, W., & **Tretter, T. R.** (2017). Modeling the eclipse. *The Science Teacher, 84*(3), 47-52.

**Tretter, T. R.**, Thornburgh, W. R., & Duckwall, M. (2016). Seeing the solar system through two perspectives: Upper elementary students explore Earth and space science by modeling and observing patterns. *Science and Children, 53*(5), 60-70.

Thornburgh, W., **Tretter, T. R.**, & Duckwall, M. (2015). Seeing the solar system through two perspectives: Primary students explore Earth and space science by modeling and observing patterns. *Science and Children, 53*(4), 42-51.

Ardasheva, Y., Bowden, J. O., Morrison, J. A., & **Tretter, T. R.** (2015). Comic relief: Using comics and illustrated trade books to support science learning in first year English language learners. *Science Scope, 38*(6), 39-47.

**Tretter, T. R.** (2014). Teaching electromagnetic waves used in communication technologies. *Science Scope, 38*(2), 78-86.

**Tretter, T. R.**, Ardasheva, Y., & Bookstrom, E. (2014). A brick and mortar approach: Scaffolding use of specific science language structures for first-year English language learners. *The Science Teacher*. *81*(4), 39-44.

**Tretter, T. R.** (2012). Taking the leap: A classroom bungee jump activity helps students understand physics concepts. *The Science Teacher*. *79*(4), 53-57.

**Tretter, T. R.** (2010). Systematic and sustained: Powerful approaches for enhancing deep mathematical thinking. *Gifted Child Today, 33*(1), 16-26.

**Tretter, T. R.** (2006). Conceptualizing nanoscale. *The Science Teacher, 73*(9), 28-31.

**Tretter, T. R.** (2005). Godzilla versus scaling laws of physics. *The Physics Teacher*, *43*(8), 530-532.

**Tretter, T. R.** (2005). Egg bungee jump. *Science Scope, 28* (5), 12-18.

**Tretter, T. R.** (2004). Science in the toilet: The flush of learning. *Science Scope, 27*(5), 30-33.

**Tretter, T. R.** (2003). Gifted students speak: Mathematics problem-solving insights. *Gifted Child Today*, *26*(3), 22-33.

**Tretter, T. R.**, & Jones, M. G. (2003). A sense of scale: Studying how scale affects systems and organisms. *The Science Teacher*, *70*(1), 22-25.

**Tretter, T. R.**, (2000). Physical science lab essentials. *The Science Teacher*, *67*(7), 48-52.

## INVITED PUBLICATIONS & BOOK CHAPTERS

**Tretter, T. R.**, Ardasheva, Y., Bookstrom, E., Bowden, J., & Duckwall, M. (2015). Planetarium-based science visualizations to support complex science learning for first-year middle and high school English Learners. In K. Finson & J. Pedersen (Eds.). *Application of Visual Data in K-16 Science Classrooms* (pp. 3-26). Charlotte, NC: Information Age Publishing Inc.

**Tretter, T. R.** (2013). Commentary on Trend (2001) and Berger, Pintrich, & Stemmer (1987) *Journal of Research in Science Teaching*, special 50th anniversary virtual issue. [invited short commentary] online at http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1098-2736/homepage/50th_anniversary_virtual_issue.htm

Brown, S., Votaw, N. L., & **Tretter, T. R**. (2010). Teachers Connecting Urban Students to their Environment, In A. Bodzin, B. Klein, and S. Weaver (Eds.), *The Inclusion of Environmental*

*Education in Science Teacher Education* (pp. 191-207). Association for Science Teacher Education (ASTE) Series in Science Education, New York, NY: Springer. doi: 10.1007/978-90-481-9222_13

**Tretter, T. R.** (2008). Nanoscience and conceptions of size and scale in pre-college education. In A. E. Sweeney and S. Seal (Eds.), *Nanoscale Science and Engineering Education*. (pp. 149-165). Stevenson Ranch, CA: American Scientific Publishers.

Paechter, M., Jones M.G., **Tretter, T.**, Bokinsky, A., Kubasko, D., Negishi A. & Andre, T. (2006). Hands-on in science education: Multimedia instruction that is appealing to female and male students. In D. Grabe & L. Zimmermann (Eds.), *Multimedia Applications in Education* (pp. 78-85). Graz, Austria: FH Joanneum. (Best Paper Award, September, 6th 2006)

Jones,M. G., Bokinsky, A., **Tretter, T.**, Negishi, A., Kubasko, D., Taylor, R., & Superfine, R., (2002). Atomic force microscopy with touch: Educational applications. In A. Mendez-Vilas, (Ed.), *Science, technology and education of microscopy: An overview, vol. II* (pp. 776-786). Madrid, Spain: Formatex.

## TECHNICAL REPORTS

National Center on Education and the Economy (NCEE), Chemistry Task Force (12 people from across the nation on task force) including **Thomas R. Tretter**. (2013). Report to the participating States from the NCEE Chemistry Task Force on setting Excellence for All College-Ready Qualification Scores. Washington, DC: Author.

National Center on Education and the Economy (NCEE), Biology Task Force (12 people from across the nation on task force) including **Thomas R. Tretter**. (2012). Report to the participating States from the NCEE Biology Task Force on setting Excellence for All College-Ready Qualification Scores. Washington, DC: Author.

## NEWSLETTER PUBLICATIONS

**Tretter, T. R.** (2016, April). *Teaching grade 5 structure and properties of matter through modeling*. Kentucky Science Teachers Association (KSTA) quarterly newsletter.

**Tretter, T. R.**, Thornburgh, W., & Duckwall, M. (2015, April). *Earth and the solar system: Observations, patterns, and scientific modeling from grade 1 – middle school*. Kentucky Science Teachers Association (KSTA) quarterly newsletter.

**Tretter, T. R.,** Thornburgh, W., & Duckwall, M. (2015, April). *Earth and the solar system: Observations, patterns, and scientific modeling from grade 1 – middle school.* Science Connection Monthly Newsletter published by Kentucky Department of Education.

**Tretter, T. R.** (2014, December). *Solar system scale walk.* Science Connection Monthly Newsletter published by Kentucky Department of Education.

**Tretter, T. R.** (2014, October). *Interactive introduction to foundational characteristics of waves*. Science Connection Monthly Newsletter published by Kentucky Department of Education.

## REPRINTED PUBLICATIONS

**Tretter, T. R.** (2009). Gifted students speak: Mathematics problem-solving insights. In Deborah Eyre, (Ed.), *Gifted and Talented Education, Major Themes in Gifted Education Series, vol. III*. New York: Routledge.

**Tretter, T. R.** (2005). Gifted students speak: Mathematics problem-solving insights. In S. K. Johnsen & J. Kendrick (Eds.), *A Gifted Child Today reader: Math Education for Gifted Students* (pp. 119-143). Waco, TX: Prufrock Press, Inc.

## PENDING PUBLICATIONS

Tinnell, T., Ralston, P., **Tretter, T**., & Mills, M. (accepted). Sustaining pedagogical change via faculty learning communities. *International Journal of STEM Education.*

Mark, S., **Tretter, T. R.,** Eckels, L., & Strite, A. (under review). An equity lens on NGSS-aligned classroom embedded assessments. *Innovations in Science Teacher Education*.

Honken, N., **Tretter, T. R.**, Ralston, P., & Pearson, D. (under review). The step-outs to stars engineering retention framework . *Journal of Engineering Education.*

Jacobi-Vessels, J. L., **Tretter, T. R.**, & Philipp, S. B. (under review). The role of materials in fostering preschoolers' scientific exploratory behavior. *Early Education and Development*.

Carter, I., Thornburgh, W., & **Tretter, T. R.** (under review). Developing K-12 teachers' actionable understanding of the multi-dimensional Next Generation Science Standards. *Journal of Science Teacher Education*

**Tretter, T. R.** (revise and resubmit). Exploring Earth geoscience processes with a flight over Mars. *Science Scope*.

**Tretter, T. R.** (in press). Teaching nanoscience to high school students. In K. Sattler (Ed.). *21st Century Nanoscience: A Handbook.* Abingdon, United Kingdom: Taylor & Francis Books, Inc.

**INVITED PRESENTATIONS**

Zeidler, K., **Tretter, T. R**., McEntyre, R., Curless, M., & Duke, C. (2017, November). *Making the 3-part science assessment system work for your district*. Full-day workshop presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

Zeidler, K., **Tretter, T. R**., McEntyre, R., Elkins, S., Curless, M., & Duke, C. (2016, November). *Science assessment system: What administrators need to know.* Full-day workshop presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

**Tretter, T. R.**, Thornburgh, W., & Duckwall, M. (2016, April). *Seeing the solar system through two perspectives: Primary and Upper elementary students explore Earth and space science by modeling and observing patterns*. Elementary Extravaganza session at National Science Teachers Association national conference, Nashville, TN.

**Tretter, T. R.** (2016, March). *Teaching a unit on Waves and Digital Communication Systems in 4$^{th}$ grade NGSS standards.* Invited full-day workshop for Oldham County elementary teachers, Crestwood, KY.

**Tretter, T. R.** (2016, February). *Gravity Shaping our Universe*. Keynote presentation to annual 2016 Kentucky Junior Science and Humanities Symposium, Louisville, KY.

**Tretter, T. R.** (2015, November). *Thinking Science across Spatial Scales: From Nanoscale to Astronomical*, University of Nebraska-Lincoln, NE.

**Tretter, T. R.** (2015, July). *One Small Step*. Public presentation in the planetarium for celebrating manned space flight anniversary of first walk on the Moon, Louisville, KY.

**Tretter, T. R.** (2015, May). *Dwarf Planets: Up Close and Personal*. Public presentation in the planetarium for celebrating first spacecraft visit to Pluto and Ceres, Louisville, KY.

**Tretter, T. R.** (2014, October). *Teaching Waves in NGSS*. Full-day workshop for Western Kentucky Education Cooperative network of science teacher leaders, Eddyville, KY.

**Tretter, T. R.** (2014, October). *Waves in NGSS*. Half-day workshop for Kentucky's facilitators of science teacher leader networks across the state, Frankfort, KY.

**Tretter, T. R.** (2014, September). *New Social Studies Standards and New Science Standards: Parallel Challenges, Parallel Opportunities*. Keynote invited presentation at Kentucky Council for the Social Studies annual conference, Erlanger, KY.

**Tretter, T. R.** (2014, June). *Next Generation Science Standards: What is New And Why We Need Them.* Invited TED-talk presentation to 2014 joint Instructional Support Leadership Network (ISLN)/Kentucky Leadership Academy (KLA) Summer Meeting, Lexington, KY.

**Tretter, T. R.** (2013, April). *Human Exploration and Knowledge Development: From the Earth to Edge of the Universe.* Presentation to Chemistry Department Graduates & Faculty at Annual Dinner Event, Louisville, KY.

**Tretter, T. R.** (2013, March). *Curious about Curiosity: Update on Mars rover mission*. Keynote presentation to annual 2013 Kentucky Junior Science and Humanities Symposium, Louisville, KY.

**Tretter, T.** (2012, June/July). *Size and Scale Research Base for Middle & High School Science Teachers*. Invited Skype-delivered presentation (series of 3 iterations of same presentation) as part of national middle/high school science teacher PD program on nanoscience instruction delivered in multiple states for NanoTeach project of McREL in Denver.

**Tretter, T. R.** (2011, April). *Early career research award 2010: Nanoscale cognition*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Orlando, FL.

Kielkopf, J., & **Tretter, T.** (2011, April). *Shared Skies Initiative: Remote Telescopy for Education.* Invited presentation to the Advanced Network STEM Technology in the Classroom showcase, University of Pennsylvania.

**Tretter, T. R.** (2010, December). *Illustrating Sustained and Sophisticated Science Investigations for BAMS Students: Shared Skies Example*. Guest speaker at Bullitt Advanced Math & Science (BAMS) Program open house.

**Tretter, T. R.** (2010, November). *Science, Technology, Engineering, and Mathematics (STEM) Education: Past, Present, and Future*. Invited speaker for annual meeting of Louisville regional chapter of Sigma Xi, a scientific research society.

Shared Skies Project Team (Kielkopf, J., Carter, B., Hart, R., Davidson, R., & **Tretter, T.**) (2010, November). *Shared Skies Initiative: Applications of remote telescope access for K-12 students.* Invited presentation at the Internet 2 Fall Membership Meeting, Atlanta, GA.

**Tretter, T. R.** (2010, July). *Size and Scale Research and Pedagogical Implications*. Invited speaker for teacher workshop in McREL NanoTeach project.

**Tretter, T. R.** (2009, October). *Nanotechnology and Contemporary Education*. Invited guest speaker for Indiana Science, Technology, Engineering, and Mathematics Symposium at Indiana University Southeast, New Albany, IN.

**Tretter, T. R.** (2009, September). *Nanoscale cognition: Challenges and promises*. Invited speaker for Purdue University seminar series for Science education doctoral student.

**Tretter, T. R.** (2008, April). *Nanotechnology and Secondary Education*. Invited guest speaker for Indiana Science, Technology, Engineering, and Mathematics Symposium at Indiana University Southeast, New Albany, IN.

## CONFERENCE PRESENTATIONS AND PAPERS

### International and National Conferences

105. **Tretter, T. R.**, & McFadden, J. R. *Elementary Extravaganza: People as Particles*. Presentation at the National Science Teachers Association (NSTA) annual conference, St. Louis, MO.

104. McFadden, J. R., Trzaskus, M., Tinnell, T., Robinson, B., & **Tretter, T. R.** (2019). *Tracking the quality of classroom-embedded, formative assessments in the era of NGSS*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Baltimore, MD.

103. Mark, S. & **Tretter, T. R.** (2019). *An equity lens on NGSS-aligned classroom embedded assessments*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Baltimore, MD.

102. Works, P., Johnson, D., McFadden, J., & **Tretter, T.** (2018). *Classroom-embedded assessments: 3D assessments for learning in elementary and middle school classrooms*. National Science Teaching Association National Conference – Atlanta, GA.

101. **Tretter, T. R.**, McFadden, J., & Robinson, B. (2018, March). *Influential factors impacting the design and use of 3-D formative assessments in elementary science classrooms*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Atlanta, GA.

100. **Tretter, T. R.** (2016, October). *Developing prototype Next Generation Science Standards summative assessments*. Consortium for Research on Educational Assessment and Teaching Effectiveness (CREATE) Annual Conference, Louisville, KY.

99. **Tretter, T. R.** & Thornburgh, W. (2016, April). *Elementary Extravaganza: Upper elementary students modeling space science*. Presentation at the National Science Teachers Association (NSTA) annual conference, Nashville, TN.

98. Thornburgh, W. & **Tretter, T. R.** (2016, April). *Elementary Extravaganza: Primary students modeling space science*. Presentation at the National Science Teachers Association (NSTA) annual conference, Nashville, TN.

97. Philipp, S. B., **Tretter, T. R.**, & Rich, C. V. (2016, April). *Impacting STEM performance: Undergraduate teaching assistants as a fulcrum for elevating instructional practices*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Baltimore, MD.

96. Ardasheva, Y., & **Tretter, T.** (2015, May). *Science Vocabulary Support (SVS) program development, refinement, and preliminary effectiveness evaluation*. A session in Guerrettaz, A. M., Zahler, T., Murie, R., Ardasheva, Y., George-Hirons A., & Tretter, T. *Processes and practices of materials development in content-based language teaching* [symposium] presented at the Ninth International Conference on Language Teacher Education, Minneapolis, MN.

95. Weiland, I. S., **Tretter, T.**, & Thornburgh, W. (2015, April). *Developing K-12 teachers' understanding of the multi-dimensional Next Generation Science Standards*. Poster presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL.

94. Ardasheva, Y., & **Tretter, T.** (2015, April*). Addressing science vocabulary needs of high school newcomers*. Roundtable presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL.

93. **Tretter, T. R.**, Ardasheva, Y., & Morrison, J. (2015, January). *Visually rich integrated science and language instruction to strengthen science attitudes for newcomer middle school English Learners.* Paper presented at the annual meeting of the Association for Science Teacher Education (ASTE), Portland, OR.

92. Bowden, J., Ardasheva, Y., **Tretter, T. R.**, & Bookstrom, E., (2014, October). *Scaffolding academic vocabulary development for newcomer and SIFE adolescent ELLs*. Session presented at the annual meeting of the World-Class Instructional Design and Assessment (WIDA) 2014 National Conference, Atlanta, GA.

91. **Tretter, T. R.**, & Nickerson, L. A. (2014, August). *NGSS 101: New Standards – Now What?* Presentation at Challenger Center 2014 Annual Conference, Louisville, KY.

90. **Tretter, T. R.**, & Duckwall, M. (2014, August). *Earth's Moon – Stepping Stone to the Cosmos*. Presentation at Challenger Center 2014 Annual Conference, Louisville, KY.

89. Jacobi-Vessels, J. L., Philipp, S., & **Tretter, T. R.**, & Brown, S. L. (2014, April). *Playing With Science: Investigating Exploratory Behavior of Preschool Children at a Science Museum Exhibit.* Poster presented at the American Educational Research Association (AERA) Annual Meeting, Philadelphia, PA.

88. Norton-Meier, L. A., Ardasheva, Y., **Tretter, T. R.**, & Brown, S. L. (2014, April). *Science Inquiry Centered Argumentation Model (ScICAM) for Young English Language Learners.* Paper presented at the American Educational Research Association (AERA) Annual Meeting, Philadelphia, PA.

87. **Tretter, T. R.**, & Ardasheva, Y. (2014, April). *Strengthening Science Attitudes: Planetarium-Based Scientific Visualizations for Middle and High School English Language Learners*. Poster presented at the American Educational Research Association (AERA) Annual Meeting, Philadelphia, PA.

86. **Tretter, T. R.**, Ardasheva, Y., Norton-Meier, L. A., & Brown, S. L. (2014, April). *Science Inquiry Centered Argumentation Model (ScICAM) for Young English Language Learners.* Poster presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Pittsburgh, PA.

85. Philipp, S.B., **Tretter, T.R.**, Rich, C.V. (2014, April). *Undergraduate teaching assistant impact on student academic achievement and persistence in general chemistry*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Pittsburgh, PA.

84. **Tretter, T. R.**, & Ardasheva, Y. (2014, April). *Strengthening Science Attitudes: Planetarium-Based Scientific Visualizations for Middle and High School English Language Learners*. Poster presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Pittsburgh, PA.

83. Ardasheva, Y., Bowden, J., **Tretter, T. R.**, Bookstrom, E., & Morrison, J. (2014, March). *Comic Relief for Newcomer and Interrupted-Formal-Education ELLs*. Paper presented at the annual meeting of the Teachers of English to Speakers of Other Languages (TESOL) Convention, Portland, OR.

82. Rich, C. V., **Tretter, T. R.**, Willing, G., Philipp, S., & Shirley, M. (2014, March). *Empirical Evidence of Elements that Positively Impact STEM Retention*. Poster presented at NSF Principal Investigator Meeting for Science Talent Expansion Program (STEP) Grantees. Washington, DC.

81. Philipp, S. B., **Tretter, T. R.**, & Rich, C. V. (2014, January). *Exploring Undergraduate Teaching Assistants' Influence on Student Science Identity and Persistence in STEM Coursework.* Paper presented at the annual meeting of the Association for Science Teacher Education (ASTE), San Antonio, TX.

80. Bowden, J., Ardasheva, Y., Bookstrom, E., **Tretter, T. R.**, & Duckwall, M. (2013, October). *Trade and Comic Books to Support Newcomer ELLs' Science Learning*. Paper presented at the annual meeting of the World-Class Instructional Design and Assessment (WIDA) 2013 National Conference, Milwaukee, WI.

79. Ardasheva, Y. & **Tretter, T. R.** (2013, April). *Validating Oxford's Strategy Inventory for Language Learning (SILL) for use with school-aged English Language Learners (ELLs)*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, San Francisco, CA.

78. Philipp, S. B., **Tretter, T. R.**, & Rich, C. V. (2013, April). *Development of undergraduate teaching assistants as effective peer mentors in STEM courses.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Rio Grande, Puerto Rico.

77. Philipp, S. B., **Tretter, T. R.**, & Rich, C. V. (2013, January). *From UTA to PST: Two students' pathways from scientist to teacher.* Paper presented at the annual meeting of the Association for Science Teacher Education (ASTE), Charleston, SC.

76. **Tretter, T. R.**, Rich, C. V., & Philipp, S. B. (2012, June). *Improving undergraduate STEM learning by preparing and supporting effective peer mentors*. Poster presented at Science & Mathematics Teacher Imperative (SMTI) National Conference, Arlington, VA.

75. Ardasheva, Y., Tong, S., & **Tretter, T. R.** (2012, April). *Measuring Language Learning Motivational Orientations among Precollege English Language Learners: An Instrument Validation Study*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, Vancouver, BC, Canada.

74. Ardasheva, Y. & **Tretter, T. R.** (2012, April). *Perceptions and Use of Language Learning Strategies: Results from a Survey Study*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, Vancouver, BC, Canada.

73. **Tretter, T. R.** & Ingle, E. S. (2012, March). *Immersive Visual Learning of Moon Phases and Seasons in a Planetarium Setting.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Indianapolis, IN.

72. **Tretter, T. R.**, Philipp, S. B., & Brown, S. L. (2012, March). *Characteristics of Teachers and Professional Development that Predict Growth in Life Science Content Knowledge*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Indianapolis, IN.

71. **Tretter, T. R.** (2012, March). *Galaxies and Gravity Galore*. Presented at the National Science Teachers Association (NSTA) National Conference, Indianapolis, IN.

70. Harnett, C., Philipp, S., & **Tretter, T. R.** (2012, March). *Research Initiation Grant: Can Makerspaces Develop Undergraduates' Research Creativity and Innovation?* Poster presented at NSF Engineering Education Awardees Conference, Arlington, VA.

69. Ardasheva, Y. & **Tretter, T. R.** (2012, March). *Diagnosing learning strategies to inform professional development for ESL teachers*. Paper presented at the Teachers of English to Speakers of Other Languages (TESOL) international convention, Philadelphia, PA.

68. Jones, M.G., Paechter, M., Yen, C., Gardner, G., Taylor, A., & **Tretter, T.** (2011, September). *US, Austrian, and Taiwanese teachers' concepts of spatial scale.* Paper presented at the European Science Education Association annual meeting, Lyon, France.

67. Jones, M. G., Paechter, M., Yen, C-F., Gardner, G., Taylor, A., **Tretter, T. R.,** & Stelzer, J. (2011, April). *Concepts of spatial scale: An international comparison.* Paper presented at the American Educational Research Association (AERA) Annual Meeting, New Orleans, LA.

66. Ardasheva, Y. & **Tretter, T. R.** (2011, April). *The relationships among individual differences, school characteristics, and second language (L2) reading achievement of school-aged English Language Learner students*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, New Orleans, LA.

65. Jones, M. G., Paechter, M., Gardner, G., Yen, C-F., Taylor, A., & **Tretter, T. R.** (2011, April). *Metric or English spatial scales? An international comparison of teachers' concepts*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Orlando, FL.

64. Martin, N. & **Tretter, T. R**. (2010, July). *The University of Louisville Noyce Early Start Program.* Poster presented at the NSF Robert Noyce Teacher Scholarship Conference, Washington, DC.

63. Jones, M. G., Paechter, M., Gardner, G., Yen, I., Taylor, A., & **Tretter, T.** (2010, July). *Teachers' concepts of spatial scale. An intercultural comparison between Austrian, Taiwanese,*

*and the United States*. Paper presented at the International Society of the Learning Sciences annual meeting, Chicago, IL.

62. **Tretter, T. R.** (2010, May). *Strengthening and assessing teachers' physics content knowledge.* Paper presented at the American Educational Research Association (AERA) Annual Meeting, Denver, CO.

61. Ardasheva, Y., **Tretter, T. R.**, (2010, May). *Re-designated fluent English proficient students: Closing the academic achievement gap?* Paper presented at the American Educational Research Association (AERA) Annual Meeting, Denver, CO.

60. **Tretter, T. R.** (2010, March). *Assessing Teacher Science Content Knowledge: Measurement Sensitivity to a Physics Course Intervention.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Philadelphia, PA.

59. Jett, P., Brown, S. L., & **Tretter, T. R.** (2010, January). *Elementary science teachers' value and implementation of formative assessment strategies*. Paper presented at the annual meeting of the Association for Science Teacher Education (ASTE), San Francisco, CA.

58. **Tretter, T. R.** (2010, January). *Assessing and deepening teachers' physics content and teaching knowledge.* Paper presented at the annual meeting of the Association for Science Teacher Education (ASTE), San Francisco, CA.

57. Ardasheva, Y., **Tretter, T. R.**, & Kinny, M. (2009, October). *Academic Achievement Among Middle School Re-designated Fluent English Proficient Students: Closing the Gap?* Paper presented at National Evaluation Institute Annual meeting, Louisville, KY.

56. **Tretter, T. R.**, Brown, S. L., & Bush, W. (2009, October). *Valid and Reliable Physical, Life, and Earth Science Content Assessments for Middle School Teachers*. Paper presented at National Evaluation Institute Annual meeting, Louisville, KY.

55. **Tretter, T. R.**, Jones, M. G., Wolf, J. (2009, April). *Durability of Conceptions of Big Ideas in Nanoscience*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Garden Grove, CA.

54. Brown, S. L., Votaw, N., & **Tretter, T. R.** (2009, April). *Outcomes of Summer Science Institutes on Urban Middle School Students*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, San Diego, CA.

53. Votaw, N., Brown, S. L., & **Tretter, T. R**. (2009, January). *Impact of a Summer Science Institute on Teachers' Content Knowledge and Pedagogy*. Paper presented at the Association for Science Teacher Education (ASTE) International Conference, Hartford, CT.

52. Brown, S. L., Votaw, N., & **Tretter, T. R**. (2009, January). Outcomes of Two Science Institutes on Urban Middle School Students. Paper presented at the Association for Science Teacher Education (ASTE) International Conference, Hartford, CT.

51. **Tretter, T. R.**, Mitchell, N., & Saderholm, J. (2008, August). *Critical Thinking Skills of Expert Teachers*. Paper presented at American Psychological Association (APA) Annual Conference, Boston, MA.

50. **Tretter, T. R.**, Jones, M. G., & Wolf, J. (2008, April). *Nanoscience instruction in physics*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Baltimore, MD.

49. Jones, M. G., **Tretter, T. R.**, Taylor, A., Oppewal, T. (2008, March). *Experienced and novice teachers' concepts of scale*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Baltimore, MD.

48. Wolfe, B., Huelsman, C., & **Tretter, T. R.** (2008, March). *Experiencing astronomy in the middle school*. Paper presented at the National Science Teachers Association (NSTA) National Conference, Boston, MA.

47. Jones, M. G., **Tretter, T. R.**, Taylor, A., & Oppewal, T. (2008, March). *Understanding scale: Teachers' trajectory of knowledge*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, New York City, NY.

46. Brown, S. L., **Tretter, T. R.**, & Votaw, N. L. (2008, March). *Impact of a summer science institute on urban middle school students' perceptions of science*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, New York City, NY.

45. **Tretter, T. R.**, Jones, M. G., & Wolf, J. (2008, March). *Instructional impact on high school physics students' nanoscience conceptions*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, New York City, NY.

44. **Tretter, T. R.** (2008, March). *Measuring teacher science knowledge*. Paper presented at the Mathematics and Science Partnerships Program Regional Conference, Chicago, IL.

43. Mitchell, N. G., **Tretter, T. R.**, & Saderholm, J. C. (2008, February). *Examining the critical thinking skills of expert teachers*. Paper presented at the 2008 Association of Teacher Educators Annual Conference. New Orleans, LA.

42. Brown, S. L, Votaw, N. L., **Tretter, T. R.** (2008, January). *Impact of a Summer Science Institute on Urban Middle School Students.* Paper presented at the Association for Science Teacher Education (ASTE) International Conference, St. Louis, MO.

41. **Tretter, T. R.**, Jones, M. G., & Falvo, M. (2007, April). *Nanoscience course impact on conceptions of spatial scale.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, New Orleans, LA.

40. **Tretter, T. R.,** Brown, S. L., Bush, W., Saderholm, J., & Moore, B. (2007, April). *Valid and reliable physical, life, and earth science content assessments for middle school teachers.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, New Orleans, LA.

39. Saderholm, J., **Tretter, T. R.**, & Mitchell, N. (2007, April). *Critical thinking skills of expert teachers.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, New Orleans, LA.

38. **Tretter, T. R.**, Jones, M. G., & Falvo, M. (2007, April). *Nanoscience course impact on conceptions of spatial scale.* Paper presented at the American Educational Research Association (AERA) Annual Meeting, Chicago, IL.

37. **Tretter, T. R.,** Brown, S. L., Bush, W., Saderholm, J., & Moore, B. (2007, April). *Valid and reliable physical, life, and earth science content assessments for middle school teachers.* Paper presented at the American Educational Research Association (AERA) Annual Meeting, Chicago, IL.

36. **Tretter, T. R.,** Brown, S. L., Bush, W., Saderholm, J., Moore, B, & Wilson, V. (2007, March). *Assessments of middle school teachers' science content knowledge.* Paper presented at the National Science Teachers Association (NSTA) National Conference, St. Louis, MO.

35. Mitchell, N., **Tretter, T. R.**, & Saderholm, J. (2007, January). *Critical thinking skills of expert teachers.* Paper presented at the Association for Science Teacher Education (ASTE) International Conference, Clearwater Beach, FL.

34. **Tretter, T. R.**, Brown, S. L., Moore, B., Saderholm, J. & Bush, W. (2007, January). *Diagnostic teacher assessments of science content knowledge of middle school teachers: Structural characteristics, validity, and reliability.* Paper presented at the Association for Science Teacher Education (ASTE) International Conference, Clearwater Beach, FL.

33. Brown, S. L., **Tretter, T. R.**, Stauble, K., & Votaw, N. (2007, January). *Impact of a summer science institute on urban middle school students' perceptions of science.* Paper presented at the Association for Science Teacher Education (ASTE) International Conference, Clearwater Beach, FL.

32. Paechter, M., Jones, M. G., & **Tretter, T. R.** (2006, September). *Hands-on in science education: Multimedia instruction that is appealing to female and male students*. Paper presented at the Multimedia Applications in Education Conference (MApEC) International Conference, Graz, Austria. (won best paper award in "Women & IT" category)

31. **Tretter, T. R.**, Jones, M. G., & Minogue, J. (2006, April). *Conceptions of Spatial Scale: Leaping into other Worlds.* Paper presented at the American Educational Research Association (AERA) Annual Meeting, San Francisco, CA.

30. Brown, S., **Tretter, T. R.**, Moore, B., Saderholm, J., & Kemp, A. (2006, April). *Valid and Reliable Physical, Life, and Earth Science Content Assessments for Middle School Teachers*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, San Francisco, CA.

29. **Tretter, T. R.**, Jones, M. G., & Minogue, J. (2006, April). *Navigating across Spatial Scales in Science: Different Worlds, Unifying Concept*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, San Francisco, CA.

28. **Tretter, T. R.**, Brown, S. L., & Votaw, N. (2006, January). *Focused professional development to enhance specific teacher content knowledge.* Paper presented at the Association for Science Teacher Education International Conference, Portland, OR.

27. Mitchell, N., Evers, A., & **Tretter, T. R.** (2006, January). *Relationships between teachers' critical thinking, efficacy, and content knowledge.* Paper presented at the Association for Science Teacher Education International Conference, Portland, OR.

26. Saderholm, J., & **Tretter, T. R.** (2006, January). *Analysis of middle school physical science content standards: What are four major standards documents really saying?* Paper presented at the Association for Science Teacher Education International Conference, Portland, OR.

25. **Tretter, T. R.**, Jones, M. G., Andre, T., Negishi, A., & Minogue, J. (2005, April). *Conceptual distances and conceptual boundaries: Students' and adults' conceptualizations of spatial scale in science.* Paper presented at the American Educational Research Association (AERA) Annual Meeting, Montreal, Canada.

24. Jones, M. G., **Tretter, T. R.**, Paechter, M., Kubasko, D., Bokinsky, A., Andre, T., & Negishi, A. (2005, April). *Spectator or participant? African-American students' writing about science.* Paper presented at the American Educational Research Association (AERA) Annual Meeting, Montreal, Canada.

23. Minogue, J., Jones. M.G., **Tretter, T.** (2005, April). *Investigating the efficacy of haptic science instruction*. Paper presented at the American Educational Research Association (AERA) Annual Meeting, Montreal, Canada.

22. Painter, J., Jones, M. G., **Tretter, T. R.**, & Kubasko, D. (2005, April). *Pulling back the curtain: Revealing and changing students' perceptions of scientists.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Dallas, TX.

21. **Tretter, T. R.**, Jones, M. G., Andre, T., Negishi, A., & Minogue, J. (2005, April). *Scale of scientific phenomena: Demarcation of distinct spatial scales in experts' and students' cognitive frameworks*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Dallas, TX.

20. Jones, M. G., **Tretter, T. R.**, Paechter, M., Kubasko, D., & Andre, T. (2005, April). *Differences in African-American and Euro-American students' perceptions of science instruction.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Dallas, TX.

19. Dotger, S., Jones, M. G., Kubasko, D., & **Tretter, T. R**. (2005, April). *The mis-match between goals and results: Looking at nature of science through the reflective judgment model.* Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Dallas, TX.

18. Minogue, J., Jones, M. G., & **Tretter, T. R.** (2005, April). *Virtual hands-on experiences: A study of haptic feedback devices and science learning*. Paper presented at the National Association for Research in Science Teaching (NARST) Annual Conference, Dallas, TX.

17. Minogue, J., Jones, M.G., Kubasko, D., **Tretter, T.**, & Dotger, S. (2005, April). *Nanoscience education: Teaching tools for the exploration of this emerging field.* Paper presented at the National Science Teachers Association (NSTA) conference, Dallas, TX.

16. **Tretter, T. R.**, Moore, B. D., Brown, S. L., Saderholm, J. C., Kemp, A. C., & Bush, W. S. (2005, January). *Structure and Characteristics of Physical Science Assessments Designed for Middle School Teachers*. Paper presented at the Association for the Education of Teachers of Science Annual Meeting, Colorado Springs, CO.

15. Jones, M. G., **Tretter, T. R.**, Minogue, J., Taylor, R. (2005, January). *Do Hands-On Experiences Make a Difference? A Study of Haptic Feedback Devices and Science Learning*. Paper presented at the Association for the Education of Teachers of Science Annual Meeting, Colorado Springs, CO.

14, Jones, M. G., & **Tretter, T. R.** (2004, October). *Scale and Scaling Across the Content Domains.* Poster presented at second annual NSF Division Research, Evaluation, and Communication Meeting for PIs and Contractors, Washington, DC.

13. Jones, M. G., **Tretter, T. R.**, Bokinsky, A., & Negishi, A., (2004, April). *Touch and Vision: Haptic Feedback and 3-Dimensional Learning.* Paper presented at the American Educational Researchers Association Annual Meeting, San Diego, CA.

12. **Tretter, T. R.**, Jones, M. G., Andre, T., Kubasko, D., Bokinsky, A., Negishi, A., Taylor, R., & Superfine, R., (2004, April). *Conceptual Ecology of Scale in Science.* Paper presented at the American Educational Researchers Association Annual Meeting, San Diego, CA.

11. **Tretter, T. R.**, Jones, M. G., Andre, T., Kubasko, D., & Minogue, J., (2004, April). *How Small is Small? Students' Conceptions of Scale.* Paper presented at the National Association for Research in Science Teaching Annual Meeting, Vancouver, Canada

10. Kubasko, D., Jones, M. G., **Tretter, T. R.**, & Andre, T., (2004, April). *Talking Science with Scientists: Students' Synchronous versus Asynchronous Communication.* Paper presented at the National Association for Research in Science Teaching Annual Meeting, Vancouver, Canada.

9. Jones, M. G., **Tretter, T. R.**, Bokinsky, A., Negishi, A., Taylor, R, & Superfine, R., (2004, April). *Seeing or Feeling? Haptic Perception and 3-Dimensional Conceptualizations.* Paper presented at the National Association for Research in Science Teaching Annual Meeting, Vancouver, Canada.

8. **Tretter, T. R.**, Jones, M. G., Negishi, A., Kubasko, D., Bokinski, A., & Minogue, J., (2004, April). *Scale as a Unifying Theme: Size Matters.* Paper presented at the National Science Teachers Association Annual Meeting, Atlanta, GA.

7. Jones, M. G., & **Tretter, T. R.** (2003, October). *Investigating Viruses with Touch: Nanotechnology and Science Inquiry.* Poster presented at NSF Division Research, Evaluation, and Communication Meeting for PIs and Contractors, Arlington, VA.

6. Jones, M. G., **Tretter, T. R.**, Negishi, A., Taylor, R., Superfine, R., Andre, T., Kubasko, D., & Bokinsky, A. (2003, April). *Putting hands-on science to the test: Students' haptic experiences*

*with microbes.* Paper presented at the American Educational Researchers Association Annual Meeting, Chicago, IL.

5. Jones, M. G., Andre, T., Negishi, A., **Tretter, T. R.**, Kubasko, D., Bokinsky, A., Taylor, R., & Superfine, R. (2003, March). *Hands-on science: The impact of haptic experiences on attitudes and concepts.* Paper presented at the National Association for Research in Science Teaching Annual Meeting, Philadelphia, PA.

4. 3Jones, M. G., Andre, T., Kubasko, D., Bokinsky, A., Negishi, A., **Tretter, T.**, Taylor, R., & Superfine, R. (2002, April). *Touching viruses: The impact of haptic experiences on students' attitudes and concepts.* Paper presented at the National Association for Research in Science Teaching Annual Meeting, New Orleans, LA.

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3. Jones, M. G., Andre, T., Kubasko, D., Bokinsky, A., Negishi, A., **Tretter, T.**, Taylor, R., & Superfine, R. (2002, April). *Touching the unseen: The impact of haptic experiences on students' attitudes and concepts.* Paper presented at the American Educational Researchers Association Annual Meeting, New Orleans, LA.

2. Jones, M. G., Andre, T., Kubasko, D., **Tretter, T. R.**, Negishi, A., & Bokinsky, A., Taylor, R., & Superfine, R., (2002, January). *Virtual hands-on experiences: The use of haptics in students' investigations of viruses.* Paper presented at the Association for the Education of Teachers of Science Annual Meeting, Charlotte, NC.

1. **Tretter, T. R.**, (1996, October). *Fun in the algebra classroom: Some projects and activities.* Paper presented at the Association of International Schools in Africa Annual Conference, Dar Es Salaam, Tanzania, Africa.

**Regional, State, and Local Conferences**

107. McFadden, J. & **Tretter, T**. (2018, November). *Examples of Classroom Embedded Assessments in Action*. Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

106. Philipp, S., **Tretter, T.**, Mark, S., Robinson, B., & McFadden, J., (2017, November). *Developing high school classroom embedded assessments (CEA).* Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

105. Mark, S., Marksberry, A., **Tretter, T.**, Philipp, S., Robinson, B., & McFadden, J., (2017, November). *Developing middle school classroom embedded assessments (CEA)*. Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

104. McFadden, J., Wingo, R., Robinson, B., Mark, S., Philipp, S., & **Tretter, T.** (2017, November). *Developing grade K-2 classroom embedded assessments (CEA)*. Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

103. McFadden, J., Crice, J., Robinson, B., Philipp, S., Mark, S., & **Tretter, T.** (2017, November). *Developing grade 3-5 classroom embedded assessments (CEA)*. Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

102. **Tretter, T. R.** (2016, November). *Classroom Embedded Assessments (CEA) in high school*. Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

101. **Tretter, T. R.** (2016, November). *Classroom Embedded Assessments (CEA) in elementary school*. Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

100. Darst, T., & **Tretter, T. R.** (2016, November). *Urban environmental education*. Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

99. **Tretter, T. R.** (2016, November). *Classroom Embedded Assessments (CEA) in middle school*. Presented at Kentucky Science Teachers Association annual conference, Lexington, KY.

49. **Tretter, T. R.** (2015, November). *Teaching space patterns from grade 1 to middle school via modeling.* Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

48. **Tretter, T. R.** (2015, November). *Teaching waves and digital communications systems via modeling*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

47. Philipp, S. B, **Tretter, T. R.**, Rich, C., & Shirley, M. (2015, October). *How much is enough? The impact of UTAs on student performance over a year-long general chemistry sequence*. Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Lore City, OH.

46. **Tretter, T. R.** (2015, May). *One Giant Leap*. Public presentation on manned and unmanned solar system exploration in the planetarium, Louisville, KY.

45. **Tretter, T. R.**, Rich, C., Nickerson, L., Schneider, S., & Richter, N., (2014, November). *Teaching Electromagnetic Waves and Communications Technology*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

44. **Tretter, T. R.**, Nickerson, L., Schneider, S., Richter, N., & Rich, C., (2014, November). *Teaching Longitudinal Waves, Including Sound*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

43. **Tretter, T. R.**, Schneider, S., Richter, N., Rich, C., & Nickerson, L., (2014, November). *Teaching Transverse Waves and their Characteristics*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

42. **Tretter, T. R.**, Richter, N., Rich, C., Nickerson, L., & Schneider, S. (2014, November). *Teaching Wave Energy Concepts*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

41. **Tretter, T. R.** (2014, May). *Meteorites: Messengers from Space*. Public presentation for National Astronomy Day in the planetarium, Louisville, KY.

40. **Tretter, T. R.** (2014, March). *Gathering astronomical data through light spectroscopy*. Presentation to Science Club for Parents of Gifted Students, Louisville, KY.

39. **Tretter, T. R.** (2014, February). *Teaching with virtual flights through space*. Presentation at the Kentucky Science Teachers Association midwinter break, Louisville, KY.

38. **Tretter, T. R.** (2014, February). *Modeling waves in communication technologies*. Presentation at the Kentucky Science Teachers Association midwinter break, Louisville, KY.

37. **Tretter, T. R.** (2013, November). *Teaching PS4: Waves and applications for information*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

36. Philipp, S. B., **Tretter, T. R.**, & Rich, C. V. (2013, September). *Student science identity and STEM persistence in a STEM retention improvement program*. Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Daniels, WV.

35. Lowery, B., & **Tretter, T. R.** (2013, September). *Attitudes toward science and engineering of 7$^{th}$ grade campers in a week-long planetarium engineering camp*. Poster presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Daniels, WV.

34. Philipp, S.B., **Tretter, T.R.**, & Rich, C.V. (2013, July). *Development of peer learning assistance skills in general chemistry undergraduate teaching assistants.* Poster presented at the biennial Miami University Chemical Education Research Conference, Oxford, OH.

33. **Tretter, T. R.,** & Rich, C. (2013, February). *Pedagogical strategies to strengthen learning in introductory STEM courses*. University of Louisville Celebration of Teaching and Learning.

32. **Tretter, T. R**., Brown, S. L., Shirley, M. L., & Weiland, I. (2012, October). *Is a PhD in science education the right next step for me?* Presentation at the National Science Teachers Association (NSTA) Regional Conference, Louisville, KY.

31. Philipp, S. B., **Tretter, T. R.**, & Rich, C. (2012, September). *From UTA to PST: Two students' pathways from scientist to teacher.* Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Mountain Lake Conservancy, VA.

30. **Tretter, T. R.**, Lancaster, S., & Ingle, E. S. (2012, March). *Learn science at the speed of light – bring a universe of knowledge to your students.* Presentation at the Kentucky Society for Technology in Education annual conference, Louisville, KY.

29. Ingle, E. S., & **Tretter, T. R.** (2011, November). *Teaching Light by the Stars.* Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

28. **Tretter, T. R.**, & Ingle, E. S. (2011, November). *Galaxies and Gravity Galore.* Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

27. **Tretter, T. R.**, & Ingle, E. S. (2011, September). *Immersive, Visual Learning of Moon Phases and Seasons in a Planetarium Setting*. Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Carter Caves State Resort Park, KY.

26. Rich, C., **Tretter, T. R**., Nickerson, L. A., Strite, A., Sanders, B., Eckels, L., Milliner, S., Sellers, K., & Magness, K. (2011, April). *Formative Assessment Strategies Designed to Scaffold Student Learning in K-12 Science*. Paper presented at Second Annual STEM Symposium at the University of Kentucky.

25. **Tretter, T. R.** (2009, September). *Assessing teacher science content knowledge: Measurement sensitivity to a physics course intervention.* Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Shawnee State Park, OH.

24. **Tretter, T. R.**, & UL Science Methods students (2006, November). *Inquiry ideas and activities.* Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

23. Brown, S., & **Tretter, T. R.** (2006, November). *Going with the flow*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

22. Mitchell, N. G., **Tretter, T. R.**, & Saderholm, J. (2006, October). *Critical thinking skills of expert teachers*. Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Hungry Mother State Park, VA.

21. **Tretter, T. R.** (2005, November). *Godzilla's scale: Bad movie science but good classroom lesson.* Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

20. **Tretter, T. R.**, & UL Science Methods students (2005, November). *Inquiry ideas and activities.* Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

19. Votaw, N., **Tretter, T. R.**, & Brown, S. (2005, November). *Gravity with breakfast.* Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

18. Mitchell, N. G., Evers, A. M., & **Tretter, T. R.** (2005, October). *The relationship among critical thinking, self-efficacy, and content knowledge of preservice teachers.* Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Breaks Interstate Park, VA.

17. Saderholm, J. & **Tretter, T. R.** (2005, October). *Physical science content analysis of four influential documents: Consensus and tensions among content standards and assessment frameworks.* Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Breaks Interstate Park, VA.

16. Moore, B. D., **Tretter, T. R.**, Brown, S. L., & Saderholm, J. (2005, October). *Ensuring validity for science teacher content knowledge assessments.* Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Breaks Interstate Park, VA.

15. Votaw, N., **Tretter, T. R.**, & Brown, S. L. (2005, October). *Professional development targeting teachers' physical science content and pedagogical knowledge of motion and forces.* Paper presented at the Mid-Atlantic Association for Science Teacher Education Annual Meeting, Breaks Interstate Park, VA.

14. Saderholm, J. & **Tretter, T. R.** (2005, October). *Diagnostic assessments for science teachers.* Paper presented at the Teacher Quality Summit, Louisville, KY.

13. **Tretter, T. R.** (2004, November). *Complex Scientific Inquiry for the Underprepared Student*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

12. Kemp, A., **Tretter, T. R.**, & UL Science Methods students (2004, November). *Sharing Inquiry*. Presentation at the Kentucky Science Teachers Association annual conference, Lexington, KY.

11. **Tretter, T. R.**, Moore, B. D., Brown, S. L., Kemp, A. C., Saderholm, J. C., & Bush, W. S. (2004, October). *What Middle School Teachers Need to Know about Physical Science*. Paper presented at the Association for the Education of Teachers of Science Mid-Atlantic Regional Conference, Roan Mountain, TN.

10. Jones, M. G., **Tretter, T. R.**, Kubasko, D., Negishi, A., Minogue, J., Superfine, R., & Taylor, R., (2003, November). *Fighting Back: The War against Viruses.* Paper presented at the North Carolina Science Teachers Association Annual Meeting, Greensboro, NC.

9. **Tretter, T. R.** (2003, November). *Size Matters: The Physics of Scaling.* Paper presented at the North Carolina Section of the American Association of Physics Teachers Fall Meeting, Wilmington, NC.

8. Robinson, J. E., **Tretter, T. R.** (2003, October). *High Voltage Mathematics.* Paper presented at the North Carolina Council of Teachers of Mathematics Annual Conference, Greensboro, NC.

7. **Tretter, T. R.**, Jones, G., Kubasko, D., Negishi, A., & Bokinsky, A. (2002, November). *Size is important.* Paper presented at the North Carolina Science Teachers Association Annual Meeting, Greensboro, NC.

6. Jones, G., Bokinsky, A., Kubasko, D., Negishi, A., & **Tretter, T.** (2002, November). *Hands-on experiments with viruses.* Paper presented at the North Carolina Science Teachers Association Annual Meeting, Greensboro, NC.

5. **Tretter, T. R.** (2001, November). *Stupid physics tricks.* Paper presented at the North Carolina Science Teachers Association Annual Meeting, Greensboro, NC.

4. Jones, M. G., **Tretter, T. R.**, Kubasko, D., Bokinsky, A., & Negishi, A. (2001, November). *Touching viruses: Using nanotechnology to teach science.* Paper presented at the North Carolina Science Teachers Association Annual Meeting, Greensboro, NC.

3. **Tretter, T. R.** (2001, March). *Teaching with trebuchets.* Paper presented at the North Carolina Section of the American Association of Physics Teachers Spring Meeting, Durham, NC.

2. **Tretter, T. R.** (2000, November). *Preparing students for inquiry-oriented physical science.* Paper presented at the North Carolina Science Teachers Association Annual Meeting, Greensboro, NC.

1. **Tretter, T. R.**, (2000, March). *Effect of inquiry-based teaching on physical science test scores.* Paper presented at the North Carolina Association for Research in Education Annual Meeting, Chapel Hill, NC.

## TEACHING RESPONSIBILITIES

### University of Louisville

STEM 4xx: Practicum in STEM education
2012 - 2014

EDAP 694: Doctoral Professional Seminar, 1st year
Fall 2009- 2011

ECPY 696: *Applications of Hierarchical Linear Modeling*
Spring 2008, 2009

ECPY 694: *Structural Equation Modeling*
Fall 2007, 2008, 2009

PHYS 595: *Remote Astronomy for Teachers*
Spring 2007

GEOS 610: *Earth Science for Teachers*
Summer 2007

EDAP 696: Independent Study - *Nanoscale in Physics*
Fall 2006

EDAP 696: Independent Study – *Observational Astronomy*
Fall 2006

EDAP 696: Independent Study – *Misconceptions and Inquiry*
Summer 2006

EDAP 694: *Science Beyond the Classroom*
2006 - 2007

EDAP 694: *Physics for Teachers: How Things Work*
2006 - 2008

EDAP 696: Independent Study - *History of Science Education*
Spring 2006

EDAP 606: *Orientation and Readings*
Fall 2005

EDAP 696: Independent Study *Advanced Science Methods Instruction*
Fall 2005

EDAP 696: Independent Study - *Science Ways of Knowing*
Summer 2005

EDAP 696: Independent Study - *Diagnostic Assessments for Teachers of Middle Grades Science – Validity*
Spring 2005

EDTP 617/618/619: *Student Teaching – Middle and High School*
Spring 2005

EDAP 696: Independent Study - *Diagnostic Assessments for Teachers of Middle Grades Science – Creation*
Fall 2004

EDTP 607/608/609: *Middle & Secondary Science Methods*
Fall 2004 - 2008

### University of North Carolina at Chapel Hill

EDUC 293B: *Ways of Knowing* (Spring 2004)
EDUC 115D: *Inquiry into Science: Exploring Physical Science Concepts* (Fall 2003)

### Duke University

MAT 341: *Internship Reflective Practice* (mentor for student teacher) (Fall 2001)

**Science 9-12**

AP Physics (1999-2001)
Honors and Regular Physics (1998-2001)
Physical Science (1997-2001)
Foundations of Science (1997-1998)

**Mathematics 6-12**

Dynamic Systems Modeling & Problem Solving (2001-2003) – an intensive 6-week summer course for academically gifted high school seniors at The Governor's School of North Carolina.
Statistics (2000-2001)
Algebra II/Trigonometry (1995-1997)
Geometry (1995-1997)
$6^{th}$ grade math (1995-1997)
Algebra I (1992-1997)
Pre-Algebra (1992-1997)

## SERVICE ACTIVITIES

### National Service

Manuscript Reviewer

Reviewer of manuscripts for the *International Journal of Environmental and Science Education* (2011-present).

Reviewer of manuscripts for the *International Journal of Science Education* (2010-present).

Editorial Review Board member of the *Journal of Science Teacher Education* (JSTE) (2009-present).

Editorial Board member for *Journal of Research in Science Teaching* (JRST) (2007-2010).

Editorial Advisory Board member, *Journal of Nano Education* (JNE) (2007-2017).

Reviewer of manuscripts for the *Journal of Science Teacher Education* (JSTE) (2005-present).

Reviewer of manuscripts for the *Journal of Research in Science Teaching* (JRST) (2005-present).

Reviewer of manuscripts for *The Physics Teacher* journal (2001-present).

Grant Proposal Reviewer

Institute for Education Sciences (IES) Principal Grant Review Panel member for Mathematics and Science Education funding program (2011-2014).

Institute for Education Sciences (IES) grant proposal guest reviewer for Mathematics and Science Education funding program (2011, 2015).

National Science Foundation (NSF) grant proposal reviewer for Discovery Research K-12 (DR-K12), CAREER, and ITEST funding programs (2008-present).

Grant proposal reviewer for the Israel Science Foundation (2012).

Grant proposal external reviewer for The Educational Foundation of America, Westport, CT (2006).

Conference Proposal Reviewer

Review Panel member for American Educational Researchers Association (AERA) Annual conference, Division C, Section 4, Science (2010-present)

Reviewer of proposals for the American Educational Researchers Association (AERA) Annual Meetings (2004-present).

Reviewer of proposals for the National Association for Research in Science Teaching (NARST) Annual Meetings (2002-present).

Reviewer of proposals for the Association for Science Teacher Education (ASTE) Annual Meetings (2005-present).

Reviewer of proposals for the Computers and Advanced Technology in Education (CATE) conference (2003).

Professional Association Committees

National Association for Research in Science Teaching (NARST) Early Career Research Award Committee (2013-2016). Co-chair of the committee 2014-2016.

Association for Science Teacher Education (ASTE) Publications Committee (2012-2015).

National Association for Research in Science Teaching (NARST) Outstanding Doctoral Research Award Committee (2006-2008).

Other National Service

External peer reviewer for IES report published by National Center for Education Statistics (NCES) (2016).

Consultant with Human Resources Research Organization (HumRRO) on proposal for national STEM evaluation plan for Office of Naval Research (2013).

Advisory Board Member to NOVA educational programming for series *Making Stuff 2* (Making Stuff Faster, Colder, Wilder and Safer) - 2013

Member of Biology Task Force and Chemistry Task Force for National Center on Education and the Economy (NCEE) to provide technical advice to states on setting test cut scores for their "*Excellence for All*" initiatives (2012-2013).

External reviewer of scholarship materials submitted for promotion to full professor (2011).

External reviewer for new proposed Ph.D. Curriculum & Instruction program at East Carolina University (2008).

External reviewer of scholarship materials submitted for promotion and tenure to Indiana University Southeast for two faculty members (2006).

**State/Community/Schools Service**

Collaborator with Kentucky Department of Education science team to develop and pilot new state summative assessment in science consistent with Next Generation Science Standards (2015-2017).

Lead University of Louisville planetarium team to visit Nashville planetarium to explore collaboration opportunities (2015).

Archdiocese of Louisville Science Task Force to advise on science curriculum revisions for their schools (2015-2016).

Participant in Kentucky Department of Education science team to explore "*Vision and Plan for Science Education Assessment*" with the new NGSS standards adopted by KY (2014-2016).

Structure of Matter –special guest presenter to open this science unit at Kennedy Montessori Elementary School, Louisville, KY, grades 5 (2014).

Co-facilitator of Science Teacher Leader Network for OVEC/JCPS region for Next Generation Science Standards rollout statewide – monthly day-long teacher workshops + 2 days in summer (2013-2016)

Member of Kentucky team to State Science Next Generation Science Standards Communications Planning facilitated by Achieve (2014)

Coordinator, KY Junior Science & Humanities Symposium, (2013-present)

Advisory Board member, Challenger Learning Center , Louisville, KY (2013-2015)

Member of UofL team to Science Teacher Leader Network for KY efforts on new science standards (2013-2014)

Kentucky Science Teachers Association (KSTA) Board member (2013-2016).

Electricity Explorations – class special project presented to Kennedy Montessori Elementary School, Louisville, KY, grades 1-3 (2013).

Using Microscopes to see the invisible – class special project (2 days) presented to Kennedy Montessori Elementary School, Louisville, KY, grades 1-3 (2012).

UofL STEM Initiatives update to Ohio Valley Education Cooperative (OVEC) superintendents at P-16 council meeting (Sept. 26, 2012).

Summer Camps at the Planetarium. Live 5-min presentation on WAVE-3 TV (Louisville, KY) with Dr. Shelley Thomas and our respective children to publicize summer camp opportunities at the university planetarium (April 6, 2012).

Paper Airplane Aerodynamics – class science project (2 days) presented to Kennedy Montessori Elementary School, Louisville, KY, grades 1-3 (2012).

Astronomers and Science Careers after-school program presentation at Maryville elementary school, Maryville, KY, grades 1-5 (2012).

Science Fair Presentation, "*Engaging in Science at the Planetarium*," Fairdale High school, Louisville, KY (2011).

Advisory Board member, Roosevelt Perry elementary school, Louisville, KY (2010-2011).

Electricity and Magnetism series (3 days) presented to Kennedy Montessori Elementary School, Louisville, KY, grades 1-3 (2010).

Microscope use presented to Crestwood Elementary School 5$^{th}$ grade (2009).

Presentation to East Oldham Middle School students "*Air is Something*" as part of their science fair exhibitions (2008, 2009).

Judge for Newburg Middle School Science Fair (2007-2011).

Collaboration with Jefferson County Public Schools on 5-year, $25 million dollar GE-grant to improve math and science education. (2005-2010).

Judge for Manual High School Science Fair (2005-2009).

Participant in Jefferson County Public Schools Physics Alliance (2004-2009)

Judge for KY Junior Science & Humanities Symposium (2004-2006, 2013).

Site-based decision-making committee for Southern High School, Durham, NC (1999-2001).

Durham Public Schools physical sciences textbook selection committee member, Durham, NC (1999-2000).

Scholarship committee for Southern High School, Durham, NC (1998-2000).

Student Assistance Program committee for Southern High School, Durham, NC (1997-1998).

Student Council Advisor for Khartoum American School, Khartoum, Sudan, Africa (1996-1997).

Community Service Project Director for Khartoum American School, Khartoum, Sudan, Africa (1996-1997).

Khartoum American School school-wide curriculum development self-study steering committee for accreditation, Khartoum, Sudan, Africa (1996-1997).

MathCounts competition coach for Khartoum American School, Khartoum, Sudan, Africa (1995-1997).

Chair of Algebra I curriculum coordination committee for Lower Richland High School, Columbia, SC (1994-1995).

Mentor for new teacher at Lower Richland High School, Columbia, SC (1994-1995).

**University of Louisville (U of L) university-wide service**

U of L Technology Incubator Committee (2015-present)

U of L SACS Educational Programs Subcommittee (2014-2017)

U of L Libraries Faculty Advisory Board (2014-2016)

U of L 21st Century Ad Hoc Committee member on Technology Applications (2013-14)

U of L contact for the APLU Science & Mathematics Teacher Imperative (SMTI) initiative (2013-present)

U of L Advisory Board member to Research Subcommittee for University 21st Century Initiative (2013)

Graduate School Councilor (2008-2009)

NASULGC accountability committee organized by provost's office (2007-2008)

U of L Quality Enhancement Plan Development committee (2006-2007)

U of L Quality Enhancement Assessment committee (2006-2007)

U of L Internal Grants Reviewer (2005-2007). Reviewer for university-wide committee operating under the auspices of the office of the Vice-President for research

**College of Education and Human Development (CEHD) at University of Louisville (college-level service)**

CEHD ERTC staff search committees (2013, 2014)

Senior Project Advisory Board member, state-funded "CARDS to CREATE" project focused on clinical teacher preparation model at Westport middle school, Louisville, KY. (2014-2016)

CEHD Personnel committee (2010-2017)

CEHD Dean search committee (2010, 2011, 2013-14)

CEHD Curriculum committee (2008-2010)

CEHD Standard V self-study committee co-chair (2008-2009)

CEHD Ed.D. Pilot OVEC cohort steering committee and instructor (2007-2011)

CEHD Carnegie doctorate redesign committee (2007-2008)

CEHD graduate school transition committee (2007-2009)

Member of Academic Counselor search committee (2007)

CEHD conceptual framework committee (2006-2008)

CEHD Doctoral committee (2006-2013)

Committee on Committees (2006-2007)

Planetarium Committee (2006-2007)

CEHD Standard II self-study committee (2006-2008)

Educator Preparation Committee for CEHD (2006-2008)

Reviewer of proposals for Spring Research Conference hosted by U of L (2006-2009)

CEHD Standard I self-study committee (2004-2006)

**Department of Teaching and Learning, University of Louisville (dept. level service)**

Co-chair of two science education faculty search committees (2014-15)

Co-coordinator of tenure mentoring workshop series (2011-2013)

Mentor for new science education faculty (2009-present)

Middle & Secondary Dept. science education liaison with A&S faculty for middle school program redesign (2012-2013)

Chair of environmental science faculty search committee (2009-2011)

Chair of science education faculty search committee (2008-09)

T&L new Portfolio scoring interrater co-coordinator (2008)

Department's IRB Intellectual Review Committee (2007-2010)

Doctoral Program Coordinator (2006 – 2010) for Department of Teaching and Learning

Evaluator of transcripts for Education Advising Center – science ed candidates (2005-2017)

Middle/Secondary Program committee (2004-present).

Co-chair of planetarium director search committee (2006-2007)

Department of Teaching and Learning Personnel committee (2006-2007, 2009-2010)

Co-chair of science education search committee (2006-2007)

Co-chair of two search committees: science education and environmental education (2005-2006)

Liaison with A&S science dept. chairs on programs for new BS degree (2005-2006)

Department of Teaching and Learning Honors and Awards committee (2004-2007)

**Workshop Presentations**

**Tretter, T. R.**, Rumsey, C., & Bauer, N. (2015, June). Teaching Earth's Place in the Universe. Full-day teacher workshop for K-8 OVEC science teachers targeting earth & space science content and pedagogy in NGSS.

**Tretter, T. R.**, Rumsey, C., & Bauer, N. (2015, June). Waves and Digital Communications Technology in NGSS. Full-day teacher workshop for K-8 OVEC science teachers targeting waves content and pedagogy in NGSS.

**Tretter, T. R.** (and 5 other leadership team members from U. of Louisville and Jefferson County Public Schools) (2015, June). Week-long workshop for approx. 50 science teachers spanning K-12 on theme of Next Generation Science Standards Cross-Cutting Concepts of Energy, Systems, and Modeling.

Bauer, N., **Tretter, T. R.**, & Elkins, S., & (2014, July). Teaching Engineering Design standards in Next Generation Science Standards: Content & Pedagogy. Full-day teacher workshop for OVEC science teachers targeting engineering design content and pedagogy in NGSS.

**Tretter, T. R.**, Elkins, S., & Bauer, N. (2014, July). Teaching Waves standards in Next Generation Science Standards: Content & Pedagogy. Full-day teacher workshop for OVEC science teachers targeting waves content and pedagogy in NGSS.

**Tretter, T. R.** (and 5 other leadership team members from U. of Louisville and Jefferson County Public Schools) (2014, June). Week-long workshop for approx. 50 science teachers spanning K-12 on theme of Next Generation Science Standards Cross-Cutting Concepts of Energy, Systems, and Modeling.

**Tretter, T. R.** (and 5 other leadership team members from U. of Louisville and Jefferson County Public Schools) (2013, June). Week-long workshop for approx. 50 science teachers spanning K-12 on theme of Next Generation Science Standards Cross-Cutting Concepts of Energy, Systems, and Modeling

**Tretter, T. R**. (2007 - 2009 summer). *Groundwork Education in Mathematics and Science (GEMS)*. Co-facilitator for two-week summer workshops for teams of graduate science students (fellows) and middle school science teachers in preparation for the fellows to spend 2 days a week in the middle school classroom throughout the school year.

Brown, S. L. & **Tretter, T. R.** (2006 & 2007, July). *Hands-On, Minds-On Summer Science Camp*. Workshop for teachers involved with a two-week science camp for 30 seventh grade students from the Whitney Young Scholars program to explore science in a variety of community contexts, e.g. power plant, water company, sewage treatment plant, zoo, planetarium, forest reserve, Mammoth cave.

**Tretter, T. R.** & Brown, S. L. (2005, June). *Physical Science: Motion and Forces Teacher Academy.* Week-long workshop supported by Kentucky Department of Education grant for practicing teachers to deepen content knowledge and pedagogy skills in this content, Louisville, KY.

**Tretter, T. R.** (2005, June). *Sound – deepening content knowledge for teaching with FOSS science modules*. Jefferson County Public School Science Module Inquiry Institute 201 – half-day workshop, Louisville, KY.

**Tretter, T. R.** (2005, June). *Rolling and magnetic solids – deepening content knowledge for teaching with STC science modules*. Jefferson County Public School Science Module Inquiry Institute 201 – half-day workshop, Louisville, KY.

**Tretter, T. R.** (2005, April). *Science is…* Buda Elementary School classroom presentations, Buda, TX.

**Tretter, T. R.** (2004, December). *Best practices in science education.* Shelby County Middle Schools Initiative, Shelbyville, KY.

**Tretter, T. R.** (2003, November). *Physics fun day*. Cameron Park Elementary School, Hillsborough, NC.

**Tretter, T. R.** (2002, December). *Block scheduling workshop.* Neal middle school science teachers, Durham, NC.

**Tretter, T.**, Jones, M. G., Negishi, A., & Bokinsky, A. (2002, August). *Nanotechnology workshop.* Day-long workshop presented for science teachers of Durham Public Schools, Durham, NC.

**Tretter, T. R.** (2001, August). *Inquiry in the physical sciences: Making it work!* Day-long workshop presented for science teachers of Durham Public Schools, Durham, NC.

**Tretter, T. R.** (2000, September – November). *Mathematical modeling.* Series of four workshops co-presented with SHODOR foundation staff for high school math teachers of Durham Public Schools, Durham, NC.

**Tretter, T. R.** (1994-1995). *Block scheduling workshops*, various high schools in South Carolina.

## OTHER PROFESSIONAL ACTIVITIES

Nano Learning Goals Workshop, NSF-supported 3-day workshop hosted by SRI International. A group of experts in nanotechnology and 7-12 education established a framework for nanotechnology learning goals in middle and high school science classrooms. (2006, June).

Program evaluation of after-school science enrichment program (Science should be Mentoring and Encouraging the Science Skills of Youth) for middle school students, Johnston County Schools, NC (2002, June).

German-American international conference: Research on learning technologies and technology-supported education, Tampa Bay, FL (2002, May).

Cambridge Physics Outlet Workshop, Durham Public Schools, NC (2000, June).

Adams County/Ohio Valley Schools curriculum alignment for the physical science and physics portions of the High School Graduation Qualifying Examinations (2000).

Cambridge Physics Outlet pilot testing of inquiry-based instructional materials, Durham, NC (1999-2000).

Physics by Inquiry 6-week summer institute at the University of Washington, Seattle, WA (1998).

## SCHOLARLY AND PROFESSIONAL ORGANIZATIONS

American Educational Research Association (2002-present)

National Association for Research in Science Teaching (2002-present).

Association for Science Teacher Education (formerly Association for the Education of Teachers of Science) (2002-present).

School Science and Mathematics Association (2006-2010)

Association of Supervision and Curriculum Development (1998-2007).

National Science Teachers Association (1997-present).

Kentucky Science Teachers Association (2004-present).
KSTA Board Member 2013-2016.

American Association of Physics Teachers (2001-2004).

North Carolina Association of Research in Education (1999-2004).

North Carolina Science Teachers Association (1997-2004).

National Council of Teachers of Mathematics (1992-1997).