

# THOMAS R. TRETTER

updated August 3, 2009

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## ADDRESS

Department of Teaching and Learning  
University of Louisville  
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## 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

2009-present

**Associate Professor of Science Education**, Department of Teaching and Learning, University of Louisville, Louisville, Kentucky.

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)

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”
- Bruce Whearty (in progress). “Perceptions of Professional Education by Teachers of the Ethiopian Evangelical Church Mekane Yesus”
- Yuliya Ardasheva (in progress). “English Language Learners in Focus: Predictors of Academic Achievement”
- Cherry Boyles (in progress). Topic under development
- Lynda Redmon (in progress). ). Topic under development
- Donna McClamroch (in progress). Topic under development
- Mike Rowe (in progress). Topic under development

#### **Dissertation committee member**

- Chuck Fidler (2009, May). Syracuse University.
- Nate Mitchell (2009, August).
- John Williamson – Ed. D. cohort member in Educational Leadership. (in progress).
- Kricket McClure – Ed. D. cohort member in Educational Leadership. (in progress).
- Denise Allen – Ed. D. cohort member in Educational Leadership. (in progress).
- Carol Christian – Ed. D. cohort member in Educational Leadership. (in progress).
- Rina Gratz – Ed. D. cohort member in Educational Leadership. (in progress).
- Mike Hibbett – Ed. D. cohort member in Educational Leadership. (in progress).
- Annette Bridges – Ed. D. cohort member in Educational Leadership. (in progress).
- Kim Banta – Ed. D. cohort member in Educational Leadership. (in progress).
- Brennon Sapp – Ed. D. cohort member in Educational Leadership. (in progress).
- Larry Taylor – Ed. D. cohort member in Educational Leadership. (in progress).
- Debbie Powers – Ed. D. cohort member in Educational Leadership. (in progress).

### **GRANTS**

- 2009-2014    Early Start Noyce STEM Partnership, Co-PI. National Science Foundation, \$900,000

- 2007-2010 Groundwork Education in Mathematics & Science (GEMS), 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.
- 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.
- 2006 Critical Thinking of Highly Accomplished Teachers, PI. University of Louisville Intramural Research Incentive Grant, \$5000.
- 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<sup>2</sup>PMAS<sup>T</sup> 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.
- 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**

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**

- 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.
- 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.
- 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), 407 - 427.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

### **Peer-Reviewed Practitioner Journals**

- 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.** (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*. 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.

### 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

- Brown, S., Votaw, N. L., & **Tretter, T. R.** (in press). Teachers Connecting Urban Students to their Environment, In A. Bodwin (Ed.), *The Inclusion of Environmental Education in Science Teacher Education*. Association for Science Teacher Education (ASTE) monograph.

**Tretter, T. R.**, Jones, M. G. & Falvo, M. (in press). Impact of introductory nanoscience course on conceptions of spatial scale. *Journal of Nano Education*.

**Tretter, T. R.** (submitted). Systematic and sustained: Powerful approaches for enhancing deep mathematical thinking, *Gifted Child Today*.

**Tretter, T. R.**, Brown, S. L., Bush, W. S., Saderholm, J. C., & Wilson, V. (submitted). Diagnostic Teacher Assessments in Mathematics and Science (DTAMS): Valid and Reliable Science Content Assessments for Middle School Teachers. *Journal of Research in Science Teaching*.

Brown, S. L., Votaw, N. L., Stauble, K. R., & **Tretter, T. R.** (under revision). Impact of a summer science institute on urban middle school students' perceptions of science. *Journal of Science Teacher Education*

## **CONFERENCE PRESENTATIONS AND PAPERS**

### **International and National Conferences**

**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.

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.

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.

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.

**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.

**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.

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.

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

- 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.
- 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.
- 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.
- 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.
- 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)
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

- 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.
- 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.
- 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.
- 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
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Jones, 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.

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.

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.

**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**

**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.

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

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

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.

**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.

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

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

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.

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.

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.

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.

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

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

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

**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.

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.

**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.

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.

**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.

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.

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

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.

**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.

**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.

**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**

EDTP 607/608/609: Middle & Secondary Science Methods

Fall 2004 - 2008

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

Fall 2004

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 - Science Ways of Knowing

Summer 2005

EDAP 606: Orientation and Readings

Fall 2005

EDAP 696: Independent Study Advanced Science Methods Instruction

Fall 2005

EDAP 696: Independent Study - History of Science Education

Spring 2006

EDAP 694: Physics for Teachers: How Things Work

2006 - 2008

EDAP 696: Independent Study – Misconceptions and Inquiry

Summer 2006

EDAP 694: Science Beyond the Classroom

2006 - 2007

EDAP 696: Independent Study - *Nanoscale in Physics*

Fall 2006

EDAP 696: Independent Study – *Observational Astronomy*

Fall 2006

PHYS 595: *Remote Astronomy for Teachers*

Spring 2007

GEOS 610: *Earth Science for Teachers*

Summer 2007

ECPY 694: *Structural Equation Modeling*

Fall 2007, 2008

ECPY 696: *Applications of Hierarchical Linear Modeling*

Spring 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<sup>th</sup> grade math (1995-1997)

Algebra I (1992-1997)

Pre-Algebra (1992-1997)

## **SERVICE ACTIVITIES**

### **National Service**

Review Panel member for American Educational Researchers Association (AERA) Annual conference, Division C, Section 4, Science (2010-2012)

Editorial Review Board member of the *Journal of Science Teacher Education* (JSTE) (2009-2011).

National Science Foundation (NSF) grant proposal reviewer for Discovery Research K-12 (DR-K12) funding program (March 2008).

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

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

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

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

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

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

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).

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).

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

Graduate School Councilor (2008-present)

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), University of Louisville (college-level service)**

- CEHD Standard V self-study committee co-chair (2008-present)
- CEHD Curriculum committee (2008-present)
- CEHD Ed.D. Pilot OVEC cohort steering committee and instructor (2007-present)
- CEHD Carnegie doctorate redesign committee (2007-2008)
- CEHD graduate school transition committee (2007-present)
- Member of Academic Counselor search committee (2007)
- CEHD conceptual framework committee (2006-2008)
- CEHD Doctoral committee (2006-present)
- 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)
- CEHD Standard I self-study committee (2004-2006)

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

- 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-present)
- Doctoral Program Coordinator (2006 – present) for Department of Teaching and Learning
- Evaluator of transcripts for Education Advising Center – science ed candidates (2005-present)
- Middle/Secondary Program committee (2004-present).
- Co-chair of planetarium director search committee (2006-2007)
- Department of Teaching and Learning Personnel committee (2006-2007)

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)

### **Community/Schools Service**

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

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

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

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

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

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

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).

### **Workshop Presentations**

- Tretter, T. R.** (2007 & 2008 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**

School Science and Mathematics Association (2006-present)

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).

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

National Science Teachers Association (1997-present).

Kentucky Science Teachers Association (2004-present).

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).