

Rebecca McNall Krall, PhD

Associate Professor

University of Kentucky

Department of Science, Technology, Engineering, and Mathematics (STEM) Education
114 Taylor Education Building
University of Kentucky
Phone: 859-257-2176
E-mail: rebecca.krall@uky.edu

Academic Background

- Doctor of Philosophy University of Virginia, Charlottesville (2004)
Major Area: Science Education
Dissertation: *Beginning Secondary Science Teachers' Instructional Use of Educational Technology during the Induction Year*
Dissertation Advisor: Dr. Randy Bell
- Master of Education Major Area: Curriculum and Instruction (2000)
Emphasis: Science Education
Major Advisor: Dr. Ertle Thompson
- Bachelor of Arts Virginia Tech, Blacksburg (1988)
Major: Elementary Education
Certification: PreK-8
Concentrations: Science and language arts

Professional Academic Experience

- Co-Chair, Elementary Education Joint director position between the Departments of Science, Technology, Engineering, and Mathematics Education (STEM Education) and Curriculum and Instruction (2014 – present)
- Director of Graduate Studies Department of Science, Technology, Engineering, and Mathematics Education (2011 – 2014)
- Associate Professor Science Education, Department of Science, Technology, Engineering, and Mathematics Education (2011 – present)
- Associate Professor Science Education, Department of Curriculum and Instruction (2007 – 2011)
- Assistant Professor Elementary Science Education, Department of Curriculum and Instruction, University of Kentucky (2003 – 2007)
- Graduate Research Assistant and Instructor Curry School of Education, University of Virginia, Charlottesville, Virginia (1999 – 2003)
- Instructor Summer Enrichment Program, University of Virginia, Charlottesville, (Summer 2000)

Other Work Experience

Teacher & Placement Specialist	Huntington Learning Center, Fairfax, Virginia (1998-1999)
Sales Executive	Bell Education, Rockville, Maryland (1996-1997) Pitney Bowes, Inc., Landmark, Virginia (1995-1996)
Science Teacher	Carl Sandburg Middle School, Fairfax, Virginia (1994-1995) P. B. Smith Elementary School, Warrenton, Virginia (1988-1994)

Courses Taught

Undergraduate

SEM/EDC 328: Teaching Science in the Elementary School
EDC 433: Served as supervisor for elementary student teachers

Graduate:

EDC 777: Seminar in Curriculum & Instruction: Elementary Science
EDC 777: Seminar: Constructing Understanding in Elementary Science
EDC 781: Seminar in Curriculum & Instruction: Science Education
SEM/EDC 674: Advanced Study of Elementary Science
SEM 613: Effective Uses of Technology in Modeling Based Inquiry

Supervision:

EDC 322: Elementary Practicum, Supervisor
Kentucky Teacher Internship Program, supervisor

Grants

Principal Investigator

Krall, R. (PI), Hanley, C. (co-PI), Wilhelm, J. (co-PI), Proffitt, E. (co-PI) (January 2015-January 2016).
Project-Based Investigations on Improving Water Quality in the Kentucky River, (2013 - 2015). Kentucky Council of Postsecondary Education Grant # 1500002810. **Award: \$130,000**

Krall, R. (PI), Hanley, C. (co-PI), Wilhelm, J. (co-PI), Proffitt, E. (co-PI) (January 2014-January 2015).
Project-Based Investigations on Improving Water Quality in the Kentucky River, (2013 - 2015). Kentucky Council of Postsecondary Education Grant # 1400003461. **Award: \$130,000**

Co-Principal Investigator

Watters-Zeidler, K. (PI), Krall, R. M. (co-PI), & Cooper, R. (co-PI). (September 2012-September 2013).
Science Leadership Support Network, Central Region. Kentucky Mathematics and Science Partnership Grant #3048107634. **Award: \$195,000.**

Watters-Zeidler, K. (PI), Krall, R. M. (co-PI), & Cooper, R. (co-PI). (September 2010-September 2012).
Science Leadership Support Network, Central Region. Kentucky Mathematics and Science Partnership Grant #3048107634. **Award: \$390,000.**

Osborn, J. L. (PI), Bradley, K. (co-PI), Krall, R. L. (co-PI), Straley, J. (co-PI), Rayens, W. (co-PI). (January 2005 – December 2009). Assessing How Distance Learning for Teachers Can Enable Inquiry Science in

Rural Classrooms (Newton's Universe). National Science Foundation, Interagency Education Research Initiative (IERI) NSF Grant #0437768. **Award: \$1,998,882.**

Senior Personnel

National Science Foundation, Math and Science Partnership, NSF # 0227028: Appalachian Math and Science Partnership (August 2004 – September, 2005). Chair, Elementary/Middle Biology Summer Teacher Institute Committee. **Award: \$22,000,000.**

Evaluator

National Science Foundation, Innovative Technology Experiences for Students and Teachers, NSF Grant #0323036: IMMEX Fayette Consortium: Community Problem Solving, Fayette County Public Schools, Lexington, K. Evaluator. March 2004 – July 2007. **Award: \$1,120,000.**

Not Funded:

Krall, R. M. (PI), Hanley, C. (co-PI), & Zeidler-Watters, K. (co-PI). *Science place-based investigations in community experiences (SPICE)*. Louisville Gas & Electric/Kentucky Utilities Education Foundation. Requested award: \$100,000. Submitted November, 2013.

Hanley, C. (PI), Ichess, M. (co-PI), & Krall, R. M. (co-PI). US Department of Agriculture. *University of Kentucky gardens ready to educate and eat (healthy) network*. Submitted August 25, 2011.

National Science Foundation, Division of Research on Learning in Formal and Informal Settings (DRL). *Who Wants to Be a Scientist: A Problem-Based Learning Class on the Nature of Science to Attract Undeclared Freshmen into STEM Majors*. Submitted April, 2011.

Osborn, J. (PI), Bradley, K. (co-PI), McNall, R. (co-PI), Rayens, W. (co-PI), Straley, J. (co-PI). National Science Foundation, Research & Evaluation on Education in Science Engineering (REESE): *Emerging research & contextual stem topics: Measuring effects of teachers' science and pedagogical content knowledge on rural middle school students' learning of science*. Submitted March 2006.

Mazur, J. (PI), Anderman, L. (co-PI), McNall, R. (co-PI). National Science Foundation, Research on Learning and Education: *Deploying a Portable Immersive Visualization Lab in Science and Mathematics Classes: Impacts on Instructional Practice and Student Outcomes*. Submitted December, 2003.

Publications

Refereed Journal Articles

Potter, S., Krall, R. M., Mayo, S., Johnson, D., Zeidler-Watters, & Cooper, R. L. (in press). Population dynamics based on resource availability and founding effects: live and computational models. *American Biology Teacher*.

Beals, A., Krall, R. M., & Wymer, C. (2012). Energy flow through an ecosystem: Conceptions of in-service elementary and middle school teachers. *International Journal of Biology Education*, 2(1), available from <http://www.ijobed.com/>

Krall, R. M., (2010). Cruising the climate with spreadsheets. *Science and Children*, 47(8), 46-51.

- Beals, A. M., Krall, R. M., (2010). Tried and true: Inquiry-based environmental science investigations with the fantastic fruit fly. *Science Scope*, 33(5), 66 – 69.
- Krall, R. M., Straley, J. P., Shafer, S. A., & Osborn, J. O. (2009). Hands-on at a distance: Evaluation of a temperature and heat distance education course. *Journal of Science Education and Technology*, 18, 173-186.
- Krall, R. M., Christopher, J. A., & Atwood, R. K. (2009). Comparison of Central Appalachian inservice elementary and middle school teachers' understanding of selected light and force and motion concepts. *Science Educator*, 18, 1-16.
- Krall, R. M., Lott, K. E., & Wymer, C. (2009). Inservice elementary and middle school teachers' conceptions of photosynthesis and respiration. *Journal of Science Teacher Education*, 20, 41-55.
- Harley, D. A., Jolivette, K., McNall, R. L. (2004). Speeding up learning: Accelerated distance learning in rehabilitation education. *Assistive Technology*, 16(2), 124-134.
- McNall, R. L., & Bell, R. L. (2004). Discovering flowers in a new light. *Science & Children*, 40(4), 35-39.

Refereed Book Chapters

- Slykhuis, D., & Krall, R. M. (2011). Successful implementation of technology to teach science: Research literature review and its implications. In R. N. Ronau, C. R. Rakes, and M. L. Niess (Eds.), *Educational technology, teacher knowledge, and classroom impact: a research handbook on frameworks and approaches*. Hershey, PA: IGI Global.

Book Chapters

- McNall, R. L. (2005). Digitizing an environmental survey. In R. L. Bell, & J. Garofalo (Eds.), *Technology-integrated science units for grades 9-12*. Eugene, OR: International Society for Technology in Education.

Conference Proceedings

- Slykhuis, D. & Krall, R. (2011). Teaching Science with Technology: A decade of research. In M. Koehler & P. Mishra (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2011* (pp. 4142-4151). Chesapeake, VA: AACE.
- Swan, G., Krall, R. & Mazur, J. (2011). Enhancing Inquiry Based Instruction through Web 2.0 and Gaming. In M. Koehler & P. Mishra (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2011* (pp. 2257-2260). Chesapeake, VA: AACE.
- Krall, R.M., Cunningham, J., Bradley, K., Straley, J., Shafer, S., Rayens, W. & Osborn, J. (2008). The Impact of an Inquiry-based Physical Science Distance Learning Course on Teachers' and Students' Understanding of Temperature and Heat. In K. McFerrin et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2008* (pp. 4715-4720). Chesapeake, VA: AACE.

Manuscripts in Preparation

- Krall, R.M., Johnson, D., Mayo, S., Zeidler-Watters, K., and Cooper, R.L. (2014).** What should Cindy do?: Exploring cardiopulmonary systems through models. **(Ready for submission)**.

Potter, S., **Krall, R.M.**, Mayo, S. Johnson, D., Zeidler-Watters, K., and Cooper, R.L. (2014). Population dynamics based on resource availability and founding effects: live and computational models. (**In Review**).

Krall, R.M., Nadolski, J., Smith, L.A., Cooper, H.W. and Holsinger, R.C., Cooper, R.L., (2014) Content dependent presentation with hands-on activity for understanding buffering related to respiration for high school and introductory college courses in biological sciences. (In Manuscript).

Krall, R. M. (in preparation). Tipping the scales: Effect of distance learning course on teachers' instructional practice of temperature and heat. *International Journal of Science Education*.

Bradshaw, T. J., Krall, R. M., Cunningham, J., Bradley, K., Straley, J. P., Shafer, S. A., & Osborn, J. O. (in revision). Improving student understanding of temperature and heat through distance learning professional development for teachers. *Journal of Science Teacher Education*.

Beals, A. M., & Krall, R. L. (in preparation). Exploring 8th Grade Students' Understandings of Energy Flow through an Ecosystem. *Journal of Science Teacher Education*.

Krall, R. M., Beals, A. (in preparation). Grappling with attrition rates in a distance learning research project. *Teacher-Researcher*.

Krall, R. M., & Bell, R. L. (in revision). Effects of permeation model on beginning science teachers' instructional use of educational technology. *Journal of Science Education and Technology*.

Curriculum Development

Straley, J., Shafer, S. A., Shirocky, E., McNall, R. L., Osborn, J. L., Cunningham, J., Bradley, K., & Rayens, W. (2007, Spring). *Newton's Universe: Temperature, heat, and energy with technology*. Available: <http://www.pa.uky.edu/~straley/techNEW/StartHere.htm>

Technology-integrated distance learning course developed to improve middle school teachers' understanding of standards-based temperature, heat, and energy concepts they are expected to teach. Activities in the course are appropriate for use in the middle school grades. The course is part of the Newton's Universe project, an NSF sponsored grant (#0437768) to study the effect of the course on teachers' content knowledge and ultimately on student achievement in science.

McNall, R. L., Wymer, C., B., Griffis, B., Winterrowd, S., Tackett, D., Whittaker, C., Stodden, W., Ison, S., Kincer, K. (2005). *Biological Science Institute for Elementary and Middle School Teachers*. Curriculum guide.

Inquiry-based two-week institute developed through funding from the National Science Foundation sponsored project Appalachian Science and Math Partnership. Institute was designed to improve teachers' understanding of biology concepts they have to teach and to provide them innovative hands-on activities to teach these topics through inquiry.

McNall, R. L., Irving, K. E., Nugent, J., Swan, G., & Bell, R. L. (2003). *Why do we have to learn this? Engaging technology-integrated science activities*. CD material.

Innovative and exemplary technology-integrated science activities developed for use in pre-service and in-service science teacher professional developing in order to help teachers

effectively integrate technology in middle and secondary science curriculum. The materials utilize technology tools, such as *Starry Night Pro*, digital microscopes, spreadsheets, *ExploreScience.com* simulations, and digital cameras. Materials were disseminated for use in middle and high schools and in science methods courses at other colleges and universities through presentation at state, regional, and national conferences and workshops.

Miller, J., C., Lynn, C., McNall, R. L., Bell, R. L., Swan, G., Massarelli, P., Wayne, A., & Brittingham, M. (2002). *TRAC PAC 2: Hands-on education program*. Washington, D. C.: National Cooperative Highway Research Program (NCHRP).

Technology-integrated hands-on curriculum developed for the National Cooperative Highway Research Program (NCHRP) to integrate transportation and engineering issues in middle school and high school science and social studies curriculum.

Evaluation Reports

Krall, R. M. (2014). *2014 summary and future plans for year 2: Project-based investigations on water quality in the Kentucky River Watershed*. Year 1 Summary Report. Submitted to the Council for Postsecondary Education summarizing first year activities. (CPE grant #1400003461).

Krall, R. M., Drake, G., Sanders, L., & McCormick, G. (2007). IMMEX Fayette Consortium: Community based problem solving: Final Report. Report submitted to the National Science Foundation summarizing three-year project. (NSF grant #0323036).

Drake, G., Sanders, L., McNall, R., & McCormick, G. (2006). IMMEX Fayette Consortium: Community Based Problem Solving Third Annual Report. Report submitted to the National Science Foundation summarizing year two findings. (NSF grant #0323036).

Drake, G., Sanders, L., McNall, R., & McCormick, G. (2005). IMMEX Fayette Consortium: Community Based Problem Solving Second Annual Report. Report submitted to the National Science Foundation summarizing year one findings. (NSF grant #0323036).

PRESENTATIONS

Refereed Paper Presentations

International

Krall, R. M., Wilhelm, J. (2015, August 31 – Sept. 4). *Developing middle school science teachers' expertise in creating project-based investigations on watersheds*. Biannual meeting of the European Science Education Association, Helsinki, Finland.

Arkwright, A. B., & Krall, R. M. (2015, August 31 – Sept. 4). *Fourth and eighth grade students' conceptions of the sun as the original energy source for ecosystems*. Biannual meeting of the European Science Education Association, Helsinki, Finland.

National

Kumar, B., & Krall, R. M. (2014, November). *Improving Learning of Chemical Equilibrium with Technology*. Paper presented at the annual meeting of School Science and Mathematics, Jacksonville, FL.

- Krall, R. L. & Mabson, V. S. (2014, November). *Exploring elementary preservice teachers' conceptions of carbon cycling in trees*. Paper presented at the annual meeting for School Science and Mathematics, Jacksonville, FL.
- Mabson, V. S., & Krall, R. M. (2014, April). *Developing a instrument to explore pre-service teacher understanding of the role of trees in an ecosystem*. Paper presented at the National Conference on Undergraduate Research, Lexington, KY.
- Arkwright, A. B., & Krall, R. M. (2014, April). *Exploring fourth and eighth grade students' views of of the sun as the original energy source for ecosystems*. Paper presented at the annual meeting for the National Association for Research in Science Teaching, Pittsburgh, PA.
- Aduma, S. J., Bouwma-Gearhart, J. L., Krall, R. M., & Rogan-Klyve, Allyson. (2013, April). *Unintended consequences: Pre-service science teachers' immersion in modeling-based inquiry in tropical ecology*. Paper presented at the annual meeting for the National Association for Research in Science Teaching, El Yunque, Puerto Rico.
- Bouwma-Gearhart, J. L., Aduma, S. J., Krall, R. M., Bouwma-Gearhart, A., Xiang, L., & Rogan-Klyve, Allyson. (2013, April). *Beyond content knowledge: Improving postsecondary learners' metacognition, felt competencies and affect towards inquiry through inquiry*. Paper presented at the annual meeting for the National Association for Research in Science Teaching, El Yunque, Puerto Rico.
- Beals, A. M., & Krall, R. M. (2012, March). *Eighth Grade Students' Conceptions of Energy Flow through Ecosystems*. Paper presented at the annual meeting for the National Association for Research in Science Teaching, Indianapolis, IN.
- Cooper, R.L., Krall, R.M., Cooper, H.W. and Holsinger, R.C (2012) *Providing a simple understanding of respiration-related buffering for nurses and their clients*. The Southern Nursing Research Society, 26th Annual Conference. February 22-25, 2012. New Orleans, LA.
- Krall, R. M., & Slykhuis, D. A. (2011, April). *A review of the research on successful implementation of technology to teach science*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Orlando, FL.
- Swan, G., Krall, R. M., & Mazur, J. (2011, March). *Enhancing Inquiry Based Instruction through Web 2.0 and Gaming*. Paper presented at the annual meeting of the Society for Instructional Technology in Teacher Education, Nashville, TN.
- Slykhuis, D. A., & Krall, R. M. (2011, January). *Successful implementation of technology to teach science: Research implications*. Paper presented at the annual meeting of the Association for Science Teacher Education, Minneapolis, MN.
- Krall, R. M., Sullivan, A., Beals, A. M., Straley, J., Shafer, S., & Osborn, J. L. (2010, March). *Effecting change in teaching temperature and heat through distance learning*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Philadelphia, PA.
- Krall, R. M., Sullivan, A., Beals, A., Straley, J. P., Shafer, S. A., & Osborne, J. L. (2010, January). *Changing middle school science teachers' instructional practice through an asynchronous temperature and heat course*. Paper presented at the annual meeting of the Association for Science Teacher Education, Sacramento, CA.

- Krall, R. M., Rayens, W. S., Cunningham, J. D., Straley, J. P., Shafer, S. A., Bradley, K. D., & Osborne, J. L. (2009, April). *Effect of distance learning course on teachers' understanding of temperature and heat & impact on student learning*. Paper presented at the annual meeting for the American Educational Research Association, San Diego, CA.
- Krall, R. M., Cunningham, J. D., Rayens, W. S., Straley, J. P., Shafer, S. A., Bradley, K. D., & Osborn, J. L. (2009, January). *From distance learning course to classroom practice: Perceived effect of temperature and heat course on teachers' instructional practice*. Paper presented at the annual meeting of the Association for Science Teacher Education, Hartford, CT.
- Krall, R. M., Cunningham, J. D., Rayens, W. S., Straley, J. P., Shafer, S. A., Bradley, K. D., & Osborn, J. L. (2008, March). *The Impact of an Inquiry-based Physical Science Distance Learning Course on Teachers' and Students' Understanding of Temperature and Heat*. Paper presented at the annual meeting of the Society for Information Technology and Teacher Education, Las Vegas, NV.
- Krall, R. M., Straley, J. P., Shafer, S. A., Bradley, K. D., Cunningham, J. D., & Osborn, J. L. (2008, March-April). *Do middle school teachers integrate content they learn in a physical science distance learning course into their instruction?* Paper presented at the annual meeting of the National Association for Research in Science Teaching, Baltimore, MD.
- Krall, R. M., & Osborne, J. L. (2007, August). *Newton's Universe: Online inquiry-based physical science course for middle school teachers*. Annual Conference on Distance Teaching and Learning, Madison, WI.
- Atwood, R., Christopher, J., & McNall, R. L. (2007, April). *Are inservice elementary teachers prepared to teach fundamental concepts of magnets and the behavior of magnets?* Paper presented at the annual meeting of the National Association for Research in Science Teaching, New Orleans, LA.
- McNall, R. L., Straley, J. P., Shafer, S., A., Lott, K. E., & Osborn, J. L. (2007, January). *Virtual inquiry-based physics for teachers: Temperature and heat*. Paper presented at the annual meeting of the Association for Science Teacher Education, Clearwater, FL.
- Atwood, R., Christopher, J., & McNall, R. L. (2006, January). *Comparison of inservice elementary and middle school teachers' understanding of selected light concepts*. Paper presented at the annual meeting of the National Association of Research in Science Teaching, San Francisco, CA.
- McNall, R. L., & Lott, K. E. (2006, January). *Inservice elementary and middle school teachers' conceptions of selected life science concepts*. Paper presented at the annual meeting of the National Association of Research in Science Teaching, San Francisco, CA.
- Atwood, R., Christopher, J., & McNall, R. L. (2005, April). *Elementary teachers' understanding of standards-based light concepts before and after instruction*. Paper presented at the annual meeting of the National Association of Research in Science Teaching, Dallas, TX.
- Bell, R. L., Toti, D., McNall, R. L., & Tai, R. (2005, April). *Beginning teachers' implementation of nature of science instruction: A longitudinal study*. Paper presented at the annual meeting of the National Association of Research in Science Teaching, Dallas, TX.
- McNall, R. L. (2005, April). *Getting kids interested in science: a case study of four beginning secondary science teachers' instructional use of technology*. Paper presented at the annual meeting of the National Association of Research in Science Teaching, Dallas, TX.

- McNall, R. L., Brown, S., & Lott, K. (2005, April). *Teaching science with technology for grades K–8*. Presentation given at the annual meeting of the National Science Teachers Association, Dallas, TX.
- McNall, R. L. (2005, January). *Trial by fire: Learning to use and integrate online problem sets in a middle school science classroom*. Paper presented at the annual meeting of the Association for Science Teacher Education, Portland, OR.
- Atwood, R., Christopher, J., & McNall, R. L. (2005, January). *Elementary and middle school teachers understanding of selected light concepts*. Paper presented at the annual meeting of the Association for Science Teacher Education, Portland, OR.
- McNall, R. L. (2005, January). *Practicum or no practicum: A study exploring the impact of a teaching practicum on four first year science teachers*. Paper presented at the annual meeting of the Association for Science Teacher Education, Colorado Springs, CO.
- McNall, R. L., & Bell, R. L. (2004, April). *Getting connected: Beginning science teachers' use of technology during the induction year*. A paper presented at the annual meeting of the National Association of Research in Science Teaching, Vancouver, BC.
- McNall, R. L., & Bell, R. L. (2004, January). *Beginning science teachers' instructional use of educational technology during the induction year*. A paper presented at the annual meeting of the Association of the Education of Teachers in Science, Nashville, TN.
- Bell, R. L., Toti, D., McNall, R. L., Tai, R. (2004, January). *Beliefs into action: Beginning teachers' implementation of nature of science instruction*. A paper presented at the annual meeting of the Association of the Education of Teachers in Science, Nashville, TN.
- McNall, R. L., Irving, K. E., Loehr, J., & Bell, R. L. (2003, March). *Engaging technology-integrated science activities with real-world applications*. A paper presented at the annual meeting of the National Science Teachers Association, Philadelphia, PA.
- McNall, R. L., Bell, R. L., Tai, R. H. (2003, March). *Transforming science teaching with technology*. A paper presented at the annual meeting of the National Association of Research in Science Teaching, Philadelphia, PA.
- McNall, R. L., Bell, R. L., Tai, R. H. (2003, January). *Transforming science instruction with technology*. A paper presented at the annual meeting of the Association of the Education of Teachers in Science, St. Louis, MO.
- Bell, R. L., Matkins, J. J., & McNall, R. L. (2002, April). *Impacts of contextual and explicit instruction on preservice elementary teachers' understandings of the nature of science*. A paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- Matkins, J. J., Bell, R. L., Irving, K. E., & McNall, R. L. (2002, January). *Impacts of contextual and explicit instruction on preservice elementary teachers' understandings of the nature of science*. A paper presented at the annual meeting of the Association of the Education of Teachers in Science, Charlotte, NC.
- McNall, R. L., Irving, K. E., & Bell, R. L. (2002, January). *The Impact of an online simulation on preservice teachers' conceptions of longitudinal waves*. A paper presented at the annual meeting of the Association of the Education of Teachers in Science. Charlotte, NC.

Regional

- Beals, A. M., & Krall, R. M. (2012, February). *Examining 8th grade students' understandings of energy flow through an ecosystem*. Poster presented at the Third Annual STEM Symposium, Lexington, KY.
- Cooper, R. L., Krall, R.M., Cooper, H. and Holsinger, R.C. (2012, February) *Providing a simple understanding of respiration-related buffering for nurses and their clients*. Paper presented at the 26th annual conference of the Southern Nursing Research Society, New Orleans, LA.
- Beals, A. M., & Krall, R. M. (2011, September/October). *Examining 8th grade students' understandings of energy flow through an ecosystem*. Paper presented at the annual meeting of the Mid-Atlantic Association for Science Teacher Education, Carter Caves State Park, Kentucky.
- Krall, R. M. (2011). *From experience to practice: Effect of distance learning institute on teachers' instructional practice of science*. Paper presented at the annual STEM Symposium, Lexington, KY.
- Bradshaw, T., Krall, R., Rayens, W., Cunningham, J., Shafer, J., Straley, J., Bradley, K., & Obsorn, J. (2011). *Improving student understanding of temperature and heat through distance learning professional development for teachers*. Paper presented at the annual STEM Symposium, Lexington, KY.
- Sullivan, A., & Krall, R. M. (2010, April). *Relations between teacher and student content knowledge of graphing in the context of force, motion, and energy*. Paper presented at the annual Spring Graduate Student Research Conference, Lexington, Ky.
- Krall, R. M., Sullivan, A., Beals, A., Straley, J. P., Shafer, S. A., & Osborn, J. O. (2009, September). *Tipping the scales: Effect of distance learning course on teachers' instructional practice of temperature and heat*. Paper presented at the annual meeting for the Mid-Atlantic Association for Science Teacher Education, Friendship, OH.
- Beals, A. M., Krall, R. M., & Wymer, C. L. (2008, April). *Inservice elementary and middle school teachers' conceptions of energy flow through an ecosystem*. Paper presented at the annual Spring Graduate Student Research Conference, Cincinnati, OH.
- Atwood, R., Christopher, J., McNall, R. (2005, October). *Comparison of inservice elementary and middle school teachers' understanding of selected light concepts*. Paper presented at annual meeting of the Mid-Atlantic Association for Science Teacher Education. Breaks Interstate Park, KY/VA.
- McNall, R. L., Lamothe, J. (2005, October). *VIPT: Increasing middle school teachers' physical science knowledge through distance learning*. Paper presented at annual meeting of the Mid-Atlantic Association for Science Teacher Education. Breaks Interstate Park, KY/VA.
- Bell, R. L., Toti, D., McNall, R. L., Tai, R. (2004, October). *Beliefs into action: Beginning teachers' implementation of nature of science instruction*. A paper presented at the annual meeting of the Mid-Atlantic Regional Association of the Education of Teachers in Science, Lake Lure, NC.
- McNall, R. L., Irving, K. E., Bell, R. L., Garofalo, J. (2001, October). *The impact of an online computer simulation on teachers' conceptions of longitudinal waves*. A paper presented at the annual meeting of the Mid-Atlantic Regional Association of the Education of Teachers in Science, Hawk's Nest, WV.

State

- Kumar, B., & Krall, R. M. (2014, November). *Teaching chemical equilibrium with technology*. Paper presented at the annual meeting of the Kentucky Academy of Science. Lexington, KY.
- Krall, R. L., Hanley, C., Cook, J., Hager L.A., McKinney, L., & Turbek, K. (2014, November). *Project-based investigations of the Kentucky River watershed: From teacher institute to classroom practice*. Paper presented at the annual meeting of the Kentucky Science Teachers Association, Lexington, KY.
- Potter, S., B., Krall, R. M., Mayo, S., Johnson, D., Zeidler-Watters, K., & Cooper, R. L. (2014, November). *Population dynamics based on resource availability and founding effects: Live and computational models*. Paper presented at the annual meeting of the Kentucky Academy of Science. Lexington, KY.
- Schultz, M., Schultz-Versteegden, E., Krall, R. M., Mayo, S., Johnson, D., Zeidler-Watters, K., & Cooper, R. L. (2014, November). *New educational modules of the anatomy and function of skeletal muscles for middle school and high school students*. Paper presented at the annual meeting of the Kentucky Academy of Science. Lexington, KY.
- Kumar, B., & Krall, R. M. (2013, November). *Using Technology to Teach Chemical Equilibrium*. Paper presented at the annual meeting of the Kentucky Academy of Science. Morehead, KY.
- Krall, R. M., Curless, M., Proffitt, M. E., & Criswell, B. (2013, October). *Quality stem education programs: How do you know when you see one?* Paper presented at the Innovate to Learn Institute. Lexington, KY.
- Wilhelm, J., Fisher, M. H., Jong, C., Jackson, C., Krall, R. M., Mohr-Schroeder, M., & Criswell, B. (October, 2013). *STEM education: Bridging disciplines, bridging generations, bridging cultures*. Paper presented at the Innovate to Learn Institute. Lexington, KY.
- Krall, R.M., Cooper, H., Mayo, S., Johnson, D., Zeidler-Watters, K., Rose, S., Dixon, R. and Cooper, R.L., (2013, March) *STEM & Health: Stressors on the circulatory system*. Annual meeting of the Kentucky Chapter of the American Physiological Society, University of Kentucky, Lexington, KY.
- Krall, R.M., Rose, S., Cooper, H., Mayo, S., Johnson, D., Zeidler-Watters, K. and Cooper, R.L. (2012, October). *STEM & Health: Stressors on the circulatory system*. Paper presented at the annual meeting for the Kentucky Academy of Science. Eastern Kentucky University, Richmond, KY.
- Cooper, R.L., Sipe, G., Holsinger, R.C., Cooper, H., Krall, R.M., Johnson, D. and Zeidler-Watters, K. (2012). *Classroom activity on buffering related to respiration for high school and introductory college courses in biological sciences*. University of Kentucky College of Nursing 8th Annual Student Scholarship Showcase. March 30, 2012.
- Dixon, R., Spitz, N., Holsinger, R.C., Rose, S., Cooper, H., Krall, R.M., Johnson, D. and Zeidler-Watters, K., Cooper, R.L. (2012). *STEM & Health: Stressors on the circulatory system*. 7th Annual Showcase of Undergraduate Scholars, University of Kentucky, Lexington, Kentucky.
- LaMothe, J., McNall, R. L., Shafer, S. (2006, November). *Getting into energy transfer*. Presentation given at the annual meeting of the Kentucky Science Teachers Association, Lexington, KY.
- McNall, R. L., Loehr, J., & Bell, R. L. (2002, July). *Digital Imaging in the science classroom*. Presentation given at the annual meeting of the Virginia Biotechnology Conference. Virginia Polytechnic Institute and State University, Blacksburg, VA.

- McNall, R. L., Holzer, K. K., Malone, K. A., & Bell, R. L. (2002, November). *Teaching science with technology*. Presentation given at the annual meeting of the Virginia Association of Science Teachers, Richmond, VA.
- McNall, R. L., Irving, K. E., Loehr, J., & Bell, R. L. (2001, December). *Teaching science with technology: A panorama of effective tools*. Presentation given at the annual Virginia Education Leadership Conference, Roanoke, VA.
- McNall, R. L., Irving, K., & Bell, R. L. (2001, October). *Illuminating science through interactive web-based simulations*. Presentation given at the annual meeting of the Virginia Association of Science Teachers, Richmond, VA.
- Bell, R. L. Irving, K. E., McNall, R. L., & Rezba, R. (2001, October). *Teaching science with technology: A panorama of effective tools*. Presentation given at the annual meeting of the Virginia Association of Science Teachers, Richmond, VA.
- Irving, K. E., McNall, R. L., & Bell, R. (2001, July). *Picture this! Using the Intel Play QX3 digital microscope for data collection and analysis*. Presentation given at the annual meeting of the Virginia Biotechnology Conference. Virginia Polytechnic Institute and State University, Blacksburg, VA.
- Irving, K. E., McNall, R. L., & Bell, R. (2001, May). *Dynamic online simulations*. Presentation given at the annual Mary Washington Faculty Academy, Mary Washington College, Fredericksburg, VA
- Irving, K. E., McNall, R. L., Swan, G., & Bell, R. (2001, March). *Super science simulations*. Presentation given at the annual meeting of the Virginia Society for Technology in Education Conference, Norfolk, VA.
- Rittenhouse, P., Bell, R. L., Rezba, R., & McNall, R. L. (2000, November). *Digital microscopy in the biology classroom, QX3 style!* Presentation given at the annual meeting of the Virginia Association of Science Teachers, Roanoke, VA.

Refereed Workshop Presentations

National

- Cooper, R. L., Krall, R. M., Johnson, D. Mayo, S., Zeidler-Watters, & Schultz. (2015, April). Classroom activity on skeletal muscle anatomy and physiology. Workshop presented at the annual meeting for the National Science Teachers Association. Chicago, IL.
- Cooper, R. L., Krall, R. M., Johnson, D. Mayo, S., Zeidler-Watters, & Potts, D. (2015, April). Activity on geometry, algebra and visual projections of objects in 3D space. Workshop presented at the annual meeting for the National Science Teachers Association. Chicago, IL.
- Cooper, R. L., Krall, R. M., Johnson, D. Mayo, S., Zeidler-Watters, & Potter, S. (2015, April). Population dynamics as a module for NGSS teaching. Workshop presented at the annual meeting for the National Science Teachers Association. Chicago, IL.
- Fisher, M. H., Schack, E. O., Wilhelm, J. Thomas, J., & Krall, R. M. (2014, July). *Teacher Noticing: A Hidden Skill*. Working session presented at the joint meeting of the International Group for the Psychology of Mathematics Education (PME 38) and the North American Chapter of the

Psychology of Mathematics Education (PME-NA 36), Vancouver, BC.

State/Regional

Cooper, R. L., Krall, R. M., Johnson, D. Mayo, S., Zeidler-Watters, & Schultz, M. (2014, November). *Classroom activity on skeletal muscle anatomy and physiology*. Workshop presented at the annual meeting for the Kentucky Science Teachers Association. Lexington, KY.

Cooper, R. L., Krall, R. M., Johnson, D. Mayo, S., Zeidler-Watters, & Potts, D. (2014, November). *Activity on geometry, algebra and visual projections of objects in 3D space*. Workshop presented at the annual meeting for the Kentucky Science Teachers Association. Lexington, KY.

Cooper, R. L., Krall, R. M., Johnson, D. Mayo, S., Zeidler-Watters, & Potter, S. (2014, November). *Population dynamics as a module for NGSS teaching*. Workshop presented at the annual meeting for the Kentucky Science Teachers Association. Lexington, KY.

Reports to National Funding Agencies

Osborn, J. L., Straley, J., Bradley, K., Krall, R. M., et al. (2009, February). *Does distance learning for teachers improve student understanding of science?* Paper presented at annual meeting of Research and Evaluation on Education in Science and Engineering (REESE), Washington, DC.

Osborn, J. L., Straley, J. P., Shafer, S., Cunningham, J., McNall, R. L., Bradley, K., & Rayens, W. (2006, December). *The Newton's Universe project: Assessing middle school teacher & student understanding of physics after online professional development in rural Appalachia*. Paper presented at the annual meeting of Research and Evaluation on Education in Science and Engineering (REESE) Funded Programs, Washington, D.C.

Drake, G., Sanders, L., McNall, R., McCormick, G. (2006, February). *IMMEX Fayette Consortium: Community based problem solving*. Paper presented at the annual meeting of Information Technology Experiences for Students and Teachers (ITEST).

Invited Non-referred Paper Presentations

Local

Krall, R. M. (2012, February). *Engaging students in learning through inquiry*. Invited presentation at ITT Technical Institute, Lexington, KY.

Krall, R. M. (2009, September). *Engaging elementary children in science through educational technology tools*. Invited paper presentation to the university teacher supervisors, University of Kentucky, Lexington.

Krall, R. M. (2009, October). *Attempting the impossible: Hands-on inquiry based physics at a distance*. Invited paper presentations to the faculty in the Department of Chemistry and Physics, Eastern Kentucky University, Richmond.

Swan, G. M., & Krall, R. M. (2009, November). *Using web tools in field experiences to bridge teaching, research and service*. Invited paper presentation to the university teacher supervisors, University of Kentucky, Lexington.

Grant Related Service

- Rhodes, T., Curless, M., Krall, R. M., Proffitt, M. E., & Helm, D. (September 2014 – April 2015). Kentucky Leadership Support Network. Monthly workshops presented to Central Kentucky teachers on implementing Next Generation Science Standards. Lexington, KY.
- Rhodes, T., Curless, M., Krall, R. M., Proffitt, M. E., & Helm, D. (September 2013 – April 2014). Kentucky Leadership Support Network. Monthly workshops presented to Central Kentucky teachers on implementing Next Generation Science Standards. Lexington, KY.
- Krall, R. M. (2008, October). *Using the Newton's Universe observation instrument: A training workshop*. Workshop presented to classroom observers working on the Newton's Universe project (NSF Grant #0437768), University of Kentucky, Lexington.
- Krall, R. M. (2007, October). *Using the Newton's Universe observation instrument: A training workshop*. Workshop presented to classroom observers working on the Newton's Universe project (NSF Grant #0437768), University of Kentucky, Lexington.
- McNall, R. L. (2005, October). *Digital microscope inquiry: Using technology to support inquiry*. Invited workshop at the regional Student Technology Leadership Conference, Lexington, Kentucky.
- McNall, R. L., Osborn, J. L., Ison, S. (2005, June). *Appalachian Math and Science Partnership biology summer teacher institute for elementary and middle school teachers*. Invited workshop presented to teachers within the Central Appalachian region, sponsored by the National Science Foundation.
- McNall, R. L., & Mazur, J. (2004, October). *Digital microscope inquiry: Four stations using this new affordable science inquiry tool*. Invited workshop at the regional Student Technology Leadership Conference, Lexington, Kentucky.
- McNall, R. L., Irving, K. E., & Keefe, D. (2001, October). *Learning to use technology in education*. Invited technology workshop presented to Hunter College School of Education faculty and staff, Hunter College, New York, New York. Sponsored by U. S. Department of Education Preparing Teachers to Use Technology (PT3) grant.
- Bell, R. L., & McNall, R. L. (2001, July). *Integrating technology in secondary science instruction*. An invited workshop for the XL Education Initiative, a three-year development project with teachers in Bermuda, Hamilton, Bermuda.
- Bell, R. L., & McNall, R. L. (2001, May). *Integrating spreadsheets in secondary science teaching*. An invited workshop for the XL Education Initiative, a three-year development project with teachers in Bermuda, Hamilton, Bermuda.
- Irving, K. E., McNall, R. L., & Bell, R. L. (2001, May). *Enhancing science instruction with interactive simulations*. A workshop presented at the Faculty Academy on Instructional Technology 2001, Mary Washington College, Fredericksburg, VA.
- McNall R. L., & Bell, R. L. (2001, March). *Meet the microscope*. An invited workshop presented to faculty at Tye River Elementary School, Nelson County, Arrington, VA.

- Irving, K. E., McNall, R. L., & Bell, R. L. (2001, January). *Digital microscopy with the Intel QX3*. Workshop presented to Nelson County Public Schools in-service elementary teachers to increase technology use in the classroom through science content and pedagogy, Afton, VA.
- McNall, R., Irving, K. E., & Bell, R. L. (2000, October). *Fins, spins, and rocket stability*. A workshop presented at the Johns Hopkins University Center for Talented Youth Science and Engineering Conference, Charlottesville, VA.
- McNall, R., Irving, K. E., & Bell, R. L. (2000, October). *Introduction to the QX3 digital microscope*. Workshop presented to Southern University of Florida elementary science methods class via Internet video connection, Charlottesville, VA.
- Bell, R. L. & McNall, R. L. (2000, August). *Hampton City Schools physical science workshop*. Invited presentation at the Hampton City Public Schools In-service Workshop, Hampton, VA.
- Bell, R. L. & McNall, R. L. (2000, June). *All wrapped up!* Workshop presented at South Boston Regional QX3 digital microscope in-service, South Boston, VA.
- Bell, R. L. & McNall, R. L. (2000, May). *Technology innovations in science education: Exploring the instructional uses of the digital microscope*. An invited workshop presented at Albemarle County Public Schools in-service, Charlottesville, VA.
- Bell, R. L., Molebash, P., & McNall, R. L. (2000, November). *Using graphing calculators and probeware in the science classroom*. An invited workshop at the Piedmont Regional Science Teachers Association meeting, Charlottesville, VA.
- Bell, R. L., & McNall, R. L. (1999, October). *Creating and conducting effective science demonstrations for middle school*. An invited workshop presented at the Albemarle County Public Schools in-service, Charlottesville, VA.

Honors and Awards

- University of Kentucky College of Education Teachers Who Made a Difference Award, 2014
- Graduate paper award, STEM Symposium, University of Kentucky, February, 2012 (paper written with graduate student)
- Graduate paper award, STEM Symposium, University of Kentucky, April, 2011 (paper written with graduate student)
- University of Virginia graduate research fellowship, awarded 2002 – 2003 school year
- University of Virginia graduate research assistantship, awarded each year from 1999 – 2002
- Effective Teachers Award (1995), Fairfax County Public Schools, Fairfax Virginia

Professional & Scholarly Organizations: Memberships, Service

International Associations

European Science Education Association, Member 2015

Service to International Organizations

European Science Education Association, Presider, Annual meeting, Aug/Sept. 2015

National Associations

- Association for the Advancement of Computing in Education (AACE), Member, 2003 – present.
- American Educational Research Association (AERA), Member, 2002 – present.
- Association for Science Teacher Education (ASTE), Member, 2002 – present.
- International Society for Technology in Education (ISTE), Member, 2003 – present.
- National Association for Research in Science Teaching (NARST), Member, 2002 – present.
- National Science Teachers Association (NSTA), Member, 1989 – present.
- School Science and Mathematics Association, Member, 2002 – present.

Leadership

- Division C Graduate Student Research and Excellence Award, American Educational Research Association (AERA), Chair, 2008-2009.
- Division C Graduate Student Research and Excellence Award, American Educational Research Association (AERA), Co-chair, 2007-2008.
- Strand 12: Educational Technology, National Association of Research in Science Teaching (NARST), Chair, 2006-2007.
- Strand 12: Educational Technology, National Association of Research in Science Teaching (NARST), Co-chair, 2005-2006.
- Strand 7: Educational Technology, National Association of Research in Science Teaching (NARST), Co-chair, 2003 - 2005.

Service to National Organizations

- National Conference for Undergraduate Research, Coordinator-Education and Social Sciences, 2014.
- Association for Science Teacher Education annual meeting, Reviewer, 2004, 2005, 2007, 2009.
- National Association of Research in Science Teaching annual meeting, Reviewer, 2002, 2003, 2007 -present.
- Division C Graduate Student Research and Excellence Award, American Educational Research Association, Reviewer, 2007.
- Society for Instructional Technology in Education (SITE) annual meeting, Reviewer, 2003-2012.
- Technology Committee, Association for Science Teacher Education (ASTE), member, 2003 – 2007.

Service to Journals

- *Journal of American Biology Teacher*, Reviewer, 2014.
- *Journal of Research in Science Teaching*, Reviewer, 2007 – present.
- *School Science and Mathematics*, Reviewer, 2002- 2006.

Regional Associations

Mid-Atlantic Association for Science Teacher Education, Member, 2000-2012.

Leadership

- Mid-Atlantic Association for Science Teacher Education, Chair, 2004 – 2005.
- Mid-Atlantic Association for Science Teacher Education, Conference Chair, 2005.
- Mid-Atlantic Association for Science Teacher Education, Conference Co-chair, 2002.

Memberships and Service to State Organizations

- Kentucky Department of Education Science Leadership Support Network - Central Kentucky Region, Professional Development instructor, September 2013-June 2014.
- Kentucky Science Teachers Association (KSTA), Member, 2003-present
- Kentucky Teacher Internship Program (KTIP), Teacher educator/supervisor, 2003-2004

Local

- Annual Kentucky American Water-Fayette County School District Science Fair, Judge, (2009-present)
- *STEMx Network Initiative* Planning Committee, co-coordinator, 2012 - 2013
- *STEMx Network planning team member*, 2013-present
- STEMx Network Rubric Development Committee, 2013-2014
- Central Kentucky Education Cooperative, Science Network leadership team member, 2013-present

University

- Graduate School, Reviewer, Graduate Student Fellowship for Special Areas, 2014
- University Graduate Admissions and Standards Committee (DGS), 2011-2014
- Science Education Discussion Group, Chair, 2007-2009

College

- Co-Chair, Elementary Education Program, 2014
- College of Ed. Review and Advisory Committee on Appointments and Promotions, 2011-present
- College of Education Graduate Admissions & Standards (DGS's) – 2011 - 2014
- College of Education Courses and Curricula Committee, 2013-2014
- Innovation Summit Conference, STEM strand co-coordinator, 2012
- College of Education Faculty Council, Member, 2010-2012
- College of Education Library Committee, Member, 2009-2011

Department

- Mathematics Education Tenure Track Faculty Search Committee, member, 2014
- Mathematics Education Clinical Faculty Search Committee, member, 2014
- Science Education Clinical Faculty Search Committee, member, 2013
- Director of Graduate Studies, STEM Education Department, 2011- 2014
- Co-Chair, Secondary Science Education Program Faculty Committee, 2012, 2014
- Science Education Clinical Faculty Search Committee, member, 2012
- Chair, Secondary Science Education Program Faculty Committee, 2011-2013.
- Master Redesign Committee, Teacher Leadership Course Subcommittee, Member, 2009
- Mathematics and Science Education Master Redesign Committee, Member, 2008 – 2009

- Mathematics and Science Education Undergraduate Program Planning Committee, Member, 2008 – 2009
- Mathematics and Science Education Program Faculty Committee, Member, 2008-present
- Elementary Program Revision Committee, Member, 2004-2005
- Technology Subcommittee for the Elementary Program Revision Committee, Chair, 2004 - 2005
- Elementary Program Faculty Committee, Member, 2004- present