

## CORY T. FORBES

Associate Professor of Science Education | Coordinator, IANR Science Literacy Initiative  
College of Education and Human Sciences | School of Natural Resources  
University of Nebraska-Lincoln  
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### EDUCATION

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Ph.D	Science Education, University of Michigan School of Education Advisor and Committee Chair, Professor Elizabeth A. Davis Committee members, Professors Joe Krajcik, Jay Lemke, Michaela Zint	2009
M.S.	Natural Resources, University of Michigan School of Natural Resources & Environment Advisor and Committee Chair, Professor Michaela Zint	2009
M.S.	Science Education, University of Kansas School of Education Advisors, Professors James Ellis and Marc Mahlios	2002
Cert.	7-12 Teaching Certification in Biology, Chemistry, & General Science	2002
B.S.	Ecology & Evolutionary Biology, University of Kansas Advisor, Professor Val Smith	1999

### PROFESSIONAL EXPERIENCE

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<i>Associate Professor of Science Education</i> (50% research, 25% teaching) <i>Coordinator, IANR Science Literacy Initiative</i> (25% administration)	2014-Present
<ul style="list-style-type: none"><li>University of Nebraska-Lincoln (UNL)</li><li>School of Natural Resources, College of Agricultural Sciences and Natural Resources (CASNR), Institute for Agriculture and Natural Resources (IANR)</li><li>Department of Teaching, Learning, and Teacher Education (TLTE), College of Education and Human Sciences (CEHS)</li><li>Faculty Affiliate, Robert B. Daugherty Water for Food Institute</li><li>Faculty Affiliate, Nebraska Center for Research on Children, Youth, Families and Schools (CYFS)</li></ul>	
<i>Visiting Professor of Science Education</i>	Summer, 2013
<ul style="list-style-type: none"><li>University of Augsburg, Institute for Didactic Research and Teacher Education, Primary Education and Didactics</li></ul>	
<i>Assistant Professor of Science Education</i> (40% research, 40% teaching, 20% service)	2009-2013
<ul style="list-style-type: none"><li>University of Iowa College of Education, Dept. of Teaching and Learning</li><li>Faculty Affiliate, Center for Global and Regional Environmental Research (CGRER)</li></ul>	
<i>Graduate research assistant</i> – Professor Elizabeth A. Davis	2004-2009
<ul style="list-style-type: none"><li>University of Michigan School of Education</li><li>Doctoral Fellow, Center for Curriculum Materials in Science (CCMS; NSF CLT-0227557)</li></ul>	

*Secondary Science Teacher* (9<sup>th</sup>-grade biology and physical science) 2002-2004

- Chisholm Trail Junior High School
- Olathe School District, Olathe, Kansas

*Graduate research assistant* - Professor Joseph Heppert 2000-2002

- University of Kansas Center for Science Education
- Kansas Collaborative for Excellence in Teacher Preparation (KCETP; NSF DUE-9876676)

## **ADMINISTRATIVE LEADERSHIP**

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*Coordinator, Science Literacy Initiative, IANR, UNL* 2014-Present

Provide leadership for the development of nationally and internationally recognized research, extension, and teaching programs fostering science literacy through development of innovative programs in food, fuel, water, landscapes, people, and the integrated stewardship of agriculture and natural resources

- Founding Director, National Center for Applied STEM Literacy (NCAL). Supporting STEM teaching and learning about sustainable food systems through the development of K-12 STEM curriculum, education research and program evaluation, and nationwide engagement and capacity-building in partnership with USDA-NIFA and the national Agriculture in the Classroom (AITC) program.
- Administrative development team for the new, interdisciplinary, 15-hour undergraduate Food, Energy, and Water in Society minor that offers UNL undergraduate students the opportunity to develop the knowledge and skills to analyze and make informed decisions about current and emerging real-world, STEM-based food, energy, and water issues. Established a new course identifier (SCIL) for Science Literacy program-affiliated courses.
- Secured \$100,000+ in charitable donations from external stakeholders in support of the Science Literacy Initiative and established the Science Literacy Excellence Fund with the NU Foundation.
- Organizer, annual *STEMming into the Future* STEM outreach event at the Nebraska State Fair, involving 35+ organizations and reaching over 350,000 fairgoers.
- Supervisor and mentor for three pre-tenure STEM education faculty members and one full-time staff member
- Co-Coordinator, CASNR Masters of Applied Science program, Science for Educators specialization. Led efforts to reconstitute the program committee, redesign core curriculum, academic requirements, and faculty advising structure, and serve on college-wide MAS program committee.
- Project Director, UNL ORED Big Ideas Seed Grant to build capacity for long-term science literacy efforts. Lead a project team comprised of 10 UNL faculty representing 7 departments across 5 colleges (CASNR, CEHS, Engineering, Law, Arts and Sciences) and multiple interdisciplinary centers.
- Organizer, 2015 Science Literacy Seminar Series, which has brought 7 visiting scholars from the U.S. and Germany to UNL for invited presentations and engagement with UNL faculty.
- Lead development of external funding proposals for program-level capacity-building, evaluation, and education research efforts.
- Significant, ongoing engagement with UNL administration, faculty and graduate students from STEM, STEM education, social sciences, and humanities units, and external stakeholders.
- Provide budgetary oversight and fiscal accountability at the program level.

*Elementary Science Coordinator, University of Iowa College of Education* 2009-2013

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- Coordinator for 7 sections/year of the 07E:162 – Elementary Science Teaching Methods course, including supervision of faculty and graduate student instructors, curriculum planning, facilities management, and both program-, department-, and college-level reporting.
- Science education representative on the Elementary Teacher Education program committee.
- Provided leadership for 2-year effort to redesign of the Elementary Teacher Education program, including the development of three new integrated science/pedagogy courses for undergraduate students preparing to become K-8 teachers.

## EXTERNAL FUNDING

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### *Grant-Funded Projects*

Principal Investigator, MODELING HYDROLOGIC SYSTEMS IN ELEMENTARY SCIENCE (MoHSES; NSF DRL-1443223) and WATER FOR ELEMENTARY TEACHERS OF SCIENCE IN NEBRASKA (NE WETS), September 1, 2012 - Present (awarded August 2012). Four years of research and development to investigate elementary students' model-based reasoning about the water cycle and how elementary teachers scaffold students' model-based reasoning. The project leverages a partnership involving the University of Nebraska-Lincoln (UNL) and Michigan State University (MSU) science education programs, the Iowa Van Allen Science Teaching (VAST) Center and Grant Wood Area Education Agency (GWAEA), UNL's National Drought Mitigation Center (NDMC), the UI Center for Global and Regional Environmental Research (CGRER), and six school districts in Iowa and Nebraska.

- \$448,546 from the National Science Foundation (Discovery Research K-12)
- \$71,734 Nebraska Title IIA Improving Teacher Quality State Grant (Nebraska Coordinating Commission for Postsecondary Education)
- \$29,945 from UI Center for Global and Regional Environmental Research
- \$23,394 from the Iowa Measurement Research Foundation
- \$10,000 from UNL

Principal Investigator, CULTIVATED CROPS AS MODEL ORGANISMS TO FOSTER 3RD-GRADE STUDENTS' LEARNING ABOUT PLANTS, and Director, NATIONAL CENTER FOR AGRICULTURAL LITERACY (NCAL), June 1, 2014-Sept 30, 2019 (awarded June, 2014). A collaborative effort between UNL, USDA-NIFA, the national Agriculture in the Classroom (AITC) program, and school districts that emphasizes the science, technology, engineering, and mathematics (STEM) foundations of agricultural and natural resource systems. Project activities involve K-12 curriculum development, educational research, program evaluation, and capacity-building for increased collaboration between project partners. The long-term goal is to position UNL as a clearinghouse for evaluation of applied STEM programming, leader in applied STEM educational research, and as a hub for communication between researchers, educators, producers, policy-makers, and other stakeholders.

- \$386,600 from Hatch Multistate (regional) Research Project funds
- \$105,000 in charitable gifts from external stakeholders
- \$79,200 from USDA-NIFA
- \$49,300 UNL CASNR and Extension
- \$10,000 Big Ideas Seed Grant, UNL Office of Research and Economic Development

Principal Investigator, REFLECTIVE ASSESSMENT FOR ELEMENTARY SCIENCE (RAES), March 2012 – June 2015 (awarded January 2012). Three years of research and development to investigate 3rd-6th-grade teachers' use of Reflective Assessment, a formative assessment strategy for science. It is grounded in a partnership between UNL, the UI Colleges of Education and Engineering, VAST and GWAEA, four school districts, and CGRER.

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- \$477,812 from the Title IIA Improving Teacher Quality State Grant, State of Iowa Board of Regents
- \$39,932 from the Spencer Foundation (Small Grants Program)
- \$25,721 from University of Iowa College of Education

Principal Investigator, PROMOTING INQUIRY-BASED ELEMENTARY SCIENCE THROUGH COLLABORATIVE CURRICULUM CONSTRUCTION (PIESC3), August 2010 – July 2013 (May 2010). This project involves the development, implementation, and evaluation of a 2-year science professional development program for elementary teachers (K-5) in the Davenport Community School District (DCS) and research and development associated with reliability and validity testing of an inquiry observation protocol and scoring rubric for elementary science.

- \$134,978 from the Carver Charitable Trust
- \$73,168 from the UI CoE and VP for Research
- \$73,168 from Iowa Measurement Research Foundation and Iowa Math and Science Education Partnership

### *Pending and In Preparation Grant Proposals*

- NSF Improving Undergraduate STEM Education (IUSE), \$300,000, *Fostering Undergraduate Students' Disciplinary Learning and Water Literacy*, PI (pending)
- NSF Improving Undergraduate STEM Education (IUSE), \$300,000, *Improving Undergraduate Students' Reasoning about Socioscientific Issues and Science Literacy*, Co-PI (pending)

### *Submitted Grant Proposals (Declined/Unfunded)*

- NSF, DRK-12, \$3,000,000, *Efficacy of Science Coaching in Teacher Professional Development*, Co-PI (2015)
- North Central Region Water Network (University of Wisconsin), \$30,000, *Youth Water Education: Building informed and Empowered Youth*, Co-PI (2015)
- USDA NIFA, \$2,995,000, *Engaging young scholars in shaping new methods for genomic selection: integrating quantitative and molecular genetics using sheep as a model*, Co-PI (2015)
- Nebraska Environmental Trust, \$25,000, *Soils Education*, Co-PI (2015)
- USDA NIFA, \$500,000, *Building Resilient Organic Agroecosystems through Cover Crops and Science Literacy*, Co-PI (2014)
- NSF, Research Experience for Undergraduates (REU), \$180,000, *Immersion into the Science, Technology, Engineering, and Mathematics (STEM) Education Research Community*, Co-Investigator, (2014)
- USDA NIFA Higher Education Challenge Grant (HEC), \$30,000, *Fostering Science Literacy through Collaborative Partnerships in Nebraska: A Conference*, PI (2014)
- Title IIA Improving Teacher Quality State Grant (Nebraska Coordinating Commission for Postsecondary Education), \$76,000, *Agroecosystems as Tools for Teaching*, PI (2014)
- NSF, Integrative Graduate Education and Research Traineeship Program (IGERT), \$1,600,000, (2013), Co-Investigator
- NSF, DRK-12, \$2,800,000, *Reflective Assessment for Elementary Science*, (2012), PI
- IES, Education Research Grants, Goal II, \$2,700,000, *Professional Development for Reflective Assessment* (2011), PI
- NIH, STEM Challenge Grants, \$720,000, *Pipeline to a Healthy Iowa: Comprehensive Career Education Diverse Students* (2011), Co-Investigator
- NSF CAREER, DRK-12, \$780,000, *Integrative Inquiry Modeling (I<sup>2</sup>M) for Middle-School Atmospheric Science* (2010, 2011), PI

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- Title IIA Improving Teacher Quality State Grant, State of Iowa Board of Regents, \$448,000, *Promoting Inquiry-based Elementary Science through Collaborative Curriculum Co-construction* (2010), PI
- Iowa Math and Science Education Partnership, \$40,000, *Preparation of Elementary Science Teachers in Iowa: Developing a CORE-Based Content Knowledge Assessment for Preservice Elementary Teachers* (2010), PI

## PEER-REVIEWED PUBLICATIONS

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\*co-author was current or former student

\*\*co-author was former graduate advisor

Sole or shared first authorship indicated in bold

### *Refereed Journal Articles*

Zangori, L.\* & Forbes, C. T. (in press). Exploring 3rd-grade students' model-based explanations about plant relationships within an ecosystem. *International Journal of Science Education*.

**Forbes, C.T.**, Sabel, J.\*, & Biggers, M.\* (2015). [Elementary teachers' use of formative assessment to support students' learning about interactions between the hydrosphere and geosphere](#). *Journal of Geoscience Education*, 63(3), 210-221.

**Forbes, C.T.**, Sabel, J.\*, & Zangori, L.\* (2015). [Integrating life science content and instructional methods in elementary teacher education](#). *American Biology Teacher*, 77(9), 5-11.

**Forbes, C.T.**, Zangori, L.\*, Schwarz, C.V. (2015). [Empirical validation of integrated learning performances for hydrologic phenomena: 3rd-grade students' model-driven explanation-construction](#). *Journal of Research in Science Teaching*, 52(7), 895-921.

Sabel, J.\*, Forbes, C.T., & Zangori, L.\* (2015). [Promoting prospective elementary teachers' learning to use formative assessment for life science instruction](#). *Journal of Science Teacher Education*, 26(4), 419-445.

Vo, T.\*, Forbes, C.T., Zangori, L.\*, & Schwarz, C. (2015). [Fostering 3rd-grade students' use of scientific models with the water cycle: Elementary teachers' conceptions and practices](#). *International Journal of Science Education*, 37(15), 2411-2432.

Zangori, L.\*, Forbes, C.T., & Schwarz, C.V. (2015). [Exploring the effect of embedded scaffolding within curricular tasks on 3rd-grade students' model-based explanations about hydrologic cycling](#). *Science & Education*, 24(7-8), 957-981.

**Forbes, C.T.**, Lange, K., Möller, K., Biggers, M.\*, Laux, M., & Zangori, L.\* (2014). [Explanation-construction in 4th-grade classrooms in Germany and the United States: A cross-national comparative video study](#). *International Journal of Science Education*, 36(14), 2367-2390.

Zangori, L.\* & Forbes, C.T. (2014). [Scientific practices in elementary classrooms: 3rd-grade students' scientific explanations for seed structure and function](#). *Science Education*, 98(4), 614-639.

Biggers, M.\*, **Forbes, C.T.**, & Zangori, L.\* (2013). [Elementary teachers' curriculum design and pedagogical reasoning for supporting students' comparison and evaluation of evidence-based explanations](#). *The Elementary School Journal*, (114)1, 48-72.

**Forbes, C.T.** (2013). [Curriculum-dependent and curriculum-independent factors in preservice elementary teachers' adaptation of science curriculum materials for inquiry-based science](#). *Journal of Science Teacher Education*, (24)1, 179-197.

**Forbes, C.T.**, Biggers, M.\*, & Zangori, L.\* (2013). [Investigating essential characteristics of scientific practices in elementary science learning environments: The Practices of Science Observation Protocol \(P-SOP\)](#). *School Science and Mathematics*, (113)4, 180-190.

Zangori, L.\* & Forbes, C.T. (2013). [Preservice elementary teachers and explanation construction: Knowledge-for-practice and knowledge-in-practice](#). *Science Education*, 97(2), 310-330.

- Zangori, L.\* , **Forbes, C.T.**, & Biggers, M.\* (2013). [Fostering student sense-making in elementary science learning environments: Elementary teachers' use of science curriculum materials to promote explanation-construction](#). *Journal of Research in Science Teaching*, (50)8, 887-1017.
- Biggers, M.\* & Forbes, C.T. (2012). [Balancing teacher and student roles in elementary classrooms: Preservice elementary teachers' ideas about the inquiry continuum](#). *International Journal of Science Education*, 34(14), 2205-2229.
- Forbes, C.T.** & Davis, E.A.\*\* (2012). [Operationalizing identity in action: A comparative study of direct versus probabilistic measures of curricular role identity for inquiry-based science teaching](#). *International Journal of Science and Mathematics Education*, 10(2), 267-292.
- Davis, E.A.\*\* , Beyer, C., Forbes, C.T., & Stevens, S. (2011). [Understanding pedagogical design capacity through teachers' narratives](#). *Teaching and Teacher Education*, 27(4), 797-810.
- Forbes, C.T.** (2011). [Preservice elementary teachers' adaptation of science curriculum materials for inquiry-based elementary science](#). *Science Education*, 95, 1–29.
- Forbes, C.T.** & Zint, M.\*\* (2011). [Elementary teachers' beliefs about, perceived competencies for, and reported use of scientific inquiry to promote student learning about and for the environment](#). *Journal of Environmental Education*, 42(1), 30-42.
- Forbes, C.T.** & Davis, E.A.\*\* (2010). [Curriculum design for inquiry: Preservice elementary teachers' mobilization and adaptation of science curriculum materials](#). *Journal of Research in Science Teaching*, 47(7), 365-387.
- Forbes, C.T.** & Davis, E.A.\*\* (2010). [Beginning elementary teachers' beliefs about the use of anchoring questions in science: A longitudinal study](#). *Science Education*, 94(2), 365-387.
- Forbes, C.T.** & Davis, E.A.\*\* (2008). [The development of preservice elementary teachers' curricular role identity for science teaching](#). *Science Education*, 92(5), 909-940.
- Forbes, C.T.** & Davis, E.A.\*\* (2008). [Exploring preservice elementary teachers' critique and adaptation of curriculum materials in respect to socioscientific issues](#). *Science & Education*, 17(8-9), 829-854.
- Forbes, C.T.** (2004). [The value of peer mentoring in the development of beginning secondary science teachers: 3 case studies](#). *Mentoring & Tutoring Journal*, 12(2), 219-239.

#### *Refereed Conference Proceedings*

- Forbes, C.T.**, Schwarz, C., & Zangori, L.\* (2014). Development of an empirically-based learning performances framework for 3rd-grade students' model-based explanations about hydrologic cycling. In Polman, J. L., Kyza, E. A., O'Neill, D. K., Tabak, I., Penuel, W. R., Jurow, A. S., O'Connor, K., Lee, T., and D'Amico, L. (Eds.), *Learning and becoming in practice: The International Conference of the Learning Sciences (ICLS) 2014, Volume 1*, (pp. 46-53). Boulder, CO: International Society of the Learning Sciences.
- Zangori, L.\* , Forbes, C.T., & Schwarz, C. (2014). Investigating the effect of curricular scaffolds on 3rd-grade students' model-based explanations for hydrologic cycling. In Polman, J. L., Kyza, E. A., O'Neill, D. K., Tabak, I., Penuel, W. R., Jurow, A. S., O'Connor, K., Lee, T., and D'Amico, L. (Eds.), *Learning and becoming in practice: The International Conference of the Learning Sciences (ICLS) 2014, Volume 2*, (pp. 942-946). Boulder, CO: International Society of the Learning Sciences.
- Forbes, C.T.**, Madeira, C.A., & Slotta, J.D. (2010). Activity-theoretical research on science teachers' expertise and learning. In Gomez, K., Lyons, L., & Radinsky, J. (Eds.), *Learning in the Disciplines: Proceedings of the 9th International Conference of the Learning Sciences (ICLS 2010), Volume 1*, (pp. 651-658). Chicago, IL: International Society of the Learning Sciences.

#### *Refereed Practitioner Articles*

- Forbes, C.T.,** Vo, T.\*, Zangori, L.\*, & Schwarz, C. (2015). Supporting students' scientific modeling when learning about the water cycle, *Science and Children*, 53(2), 42-49.
- Lange, K., Forbes, C.T., Helm, K., & Hartinger, A. (2014). Forschen heißt auch Modellieren! Wie kann das im naturwissenschaftlichen Sachunterricht der Grundschule aussehen? [Inquiry includes modelling - how can this look in elementary classrooms?]. *Grundschulunterricht*, 4, 17-22.
- Zangori, L.\*, Forbes, C.T., & Biggers, M.\* (2012). This is inquiry...right? Strategies for effectively adapting elementary science lessons. *Science and Children*, 50(1), 48-53.

#### *Book Chapters*

- Forbes, C.T.** & Biggers, M.\* (in press). What kind of science teacher will I be? Teachers' curricular role identity for elementary science. In L. Avraamidou (Ed.), *Studying Teacher Identity: Theoretical Perspectives and Methodological Approaches*.
- Forbes, C.T.** & Davis, E.A. (2010). Beginning elementary teachers' curriculum design and development of pedagogical design capacity for science teaching: A longitudinal study. In L.E. Kattington (Ed.), *Handbook of Curriculum Development* (pgs. 209-232). Nova Science Publishers; New York.

#### *Other Papers*

- Biggers, M. & Forbes, C.T. (in preparation). Inquiry in elementary science learning environments: Investigating fidelity of implementation of science curriculum materials.
- Aguirre-Mendez, C.P., Promyod, N., & Forbes, C.T. (in preparation). Characteristics of scientifically-oriented questions and the nature of inquiry in elementary classrooms: A multiple-case study.
- Dauer, J. & Forbes, C.T. (in preparation). An instructional model for fostering undergraduate students' science-informed decision-making about socioscientific issues.
- Forbes, C.T.** (in preparation). From pedagogical reasoning to expansive learning: Activity-theoretical research on epistemic dimensions of expertise for teaching.
- Forbes, C.T., Vo., T., Zangori, L., & Schwarz, C. (in preparation). A quasi-experimental study of 3<sup>rd</sup>-grade students' model-based explanation-construction about water.
- Forbes, C.T.,** Zangori, L.\*, & Vo, T.\* (in preparation). Studying the impact of a design intervention on 3<sup>rd</sup>-grade students' model-based explanations for water systems.
- Lange-Schubert, K., Schubert, J., & Forbes, C.T. (in preparation). Scientific modeling for early learners: Scientific practices in the German national science standards.
- Laux, M., Forbes, C.T., Lange-Schubert, K., & Möller, K. (in preparation). Studying the influence of teachers' inquiry practices on student outcomes in primary science classrooms in Germany.
- Pinney, B., Suh, J., & Forbes, C.T. (in preparation). Dichotomous inquiry practice: Characterizing teaching practice based on five essential features of inquiry.
- Sabel, J.\* & Forbes, C.T., Zangori, L. (under revision). Investigating teachers' formative assessment practices to support elementary students' learning of life science concepts: A mixed methods study.
- Sabel, J.\*, Vo, T.\*, Alred, A., Dauer, J. & Forbes, C.T. (in preparation). Studying undergraduate students' science-informed decision-making about water issues.
- Vo., T.\* & Forbes, C.T. (in progress). A comparative study of 3<sup>rd</sup> and 5<sup>th</sup>-grade students' model-based explanations for water systems.
- Vo., T.\* & Forbes, C.T. (in progress). Preservice elementary teachers' curriculum planning and enactment to foster model-centric science learning environments.
- Vo., T.\*, Forbes, C.T., Zangori, L.\*, & Schwarz, C. (in preparation). A multiple-year longitudinal study of 3<sup>rd</sup>-grade teachers' learning to support students' model-based learning about water.

Zangori, L.\* & Forbes, C. T. (in preparation). Development of an empirically-based learning performances framework for 3rd-grade students' model-based explanations about plant processes.

## PRESENTATIONS

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### *Invited Presentations*

- Forbes, C.T. (invited, 2015, December). *Fostering science literacy in the elementary grades: Educational research on third-grade students' learning about plants*. Invited presentation at the UNL Department of Agronomy and Horticulture Seminar Series.
- Forbes, C.T. (2014, September). *Discipline-based education research on teaching and learning in elementary science learning environments*. Invited presentation at the UNL School of Natural Resources Seminar Series.
- Forbes, C.T. (2014, June). *Supporting teachers' use of curriculum materials for science: Empirically-grounded perspectives on teachers' curriculum design competencies*. Invited presentation at the International Conference of New Teacher Competencies, Center for Knowledge Creation on Teacher Development and Curriculum Design and the National Institute for Curriculum Development in The Netherlands, University of Twente, Enschede, the Netherlands.
- Forbes, C.T. (2014, March). *Discipline-based research on elementary science learning environments designed to foster students' learning about water systems*. Invited presentation at the UNL Discipline-Based Educational Research (DBER) Group Seminar.
- Forbes, C.T. (2013, June). *Supporting elementary teachers' to engage in 'high-leverage' instructional practices: Theory and research on teachers' use of elementary curriculum materials*. Invited presentation at the University of Augsburg, Augsburg, Germany.
- Forbes, C.T. (2013, April). *Supporting teachers to attend to students' ideas in elementary science learning environments: The Reflective Assessment for Elementary Science in Iowa (RAES-Iowa) project*. Invited presentation at the Lawrence Hall of Science, Full Option Science System (FOSS) group.
- Forbes, C.T. (2013, March). *Multifaceted approaches to research and development on elementary students' formulation and evaluation of scientific explanations*. Invited presentation at Florida State University College of Education.
- Forbes, C.T. (2012, May). *Integrated educational research and development to foster effective teaching and learning in K-8 science learning environments*. Invited presentation at the Center for Global and Regional Environmental Research (CGRER) Advisory Board Meeting, Iowa City, IA.
- Forbes, C.T. (2012, January). *Fostering sense-making in K-8 science learning environments through curriculum and instruction: An evolving research agenda*. Invited presentation at the University of Essen (NWU-Essen), Essen, Germany. Sponsored by the German Research Foundation (DFG).
- Forbes, C.T. (2012, February). *Fostering sense-making in K-8 science learning environments through curriculum and instruction: An evolving research agenda*. Invited presentation at the University of Münster (WWU-Münster), Münster, Germany. Sponsored by the German Research Foundation (DFG).
- Forbes, C.T. (2010, December). *Investigating and promoting elementary teachers' use of science curriculum materials to teach science as inquiry*. Invited presentation at the Dean's Annual Emeriti Faculty Symposium, University of Iowa College of Education.

### *Peer-Reviewed Conference Presentations*

- Brandt, M., Forbes, C., & Keshwani, J. (accepted). *Operationalizing science in applied contexts: Developing measures for elementary students' understanding of STEM dimensions of food systems*. Paper to be presented at the 2016 annual meeting of the National Association of Research in Science Teaching (NARST), Baltimore, MD.



- Sabel, J., Vo, T., Alred, A., Dauer, J., & Forbes, C. (accepted). *Undergraduate students' scientifically-informed decision-making about water-based socioscientific issues*. Poster to be presented at the 2016 annual meeting of the National Association of Research in Science Teaching (NARST), Baltimore, MD.
- Sabel, J., Forbes, C., & Zangori, L. (accepted). *Use of structured formative assessment assignments to engage preservice teachers with life science concepts*. Paper to be presented at the 2016 annual meeting of the National Association of Research in Science Teaching (NARST), Baltimore, MD.
- Vo, T., Forbes, C. T. (accepted). *Learning to support students' model-based learning about the water cycle: A three-year longitudinal case study of two 3rd-grade teachers*. Paper to be presented at the 2016 annual meeting of the National Association of Research in Science Teaching (NARST), Baltimore, MD.
- Zangori, L. & Forbes, C. T. (accepted). *Development of an empirically-based learning performances framework for 3rd-grade students' model-based explanations about plant processes*. Poster to be presented at the 2016 annual meeting of the National Association of Research in Science Teaching (NARST), Baltimore, MD.
- Zangori, L., Vo, T., Forbes, C.T., Schwarz, C.V. (accepted). *Exploring links between 3rd-grade students' model-based explanations and teachers' model-based science instruction about groundwater*. Paper to be presented at the 2016 annual meeting of the National Association of Research in Science Teaching (NARST), Baltimore, MD.
- Biggers, M. & Forbes, C. T. (2015, April). *Curriculum planning and enactment in elementary science: Beyond fidelity of implementation*. Paper presented at the annual meeting of the National Association for Research in Science Teaching (NARST), Chicago, IL.
- Brandt, M., Keshwani, J., Forbes, C., & Luck, J. (2015, June). *Increasing production with precision agriculture*. Paper presented at the annual meeting of the National Agriculture in the Classroom (NAITC), Louisville, KY.
- Dauer, J. & Forbes, C.T. (2015, July). *A socioscientific framework for teaching a general science literacy course*. Poster presented at the annual meeting of the Society for the Advancement of Biology Education Research (SABER), Minneapolis, MN.
- Forbes, C. T., Schwarz, C. V., Zangori, L., & Vo, T. (2015, March). *Using models to support elementary students' learning about water*. Paper presented at the annual meeting of the National Science Teachers Association (NSTA), Chicago, IL.
- Forbes, C.T., Vo, T., & Bernadt, T. (2015, Sept). *Supporting students' learning about water: Model-based scientific inquiry*. Presentation at the annual meeting of the Nebraska Association of Teachers of Science (NATS), Fremont, NE.
- Forbes, C. T., Vo, T., Schwarz, C. V., & Zangori, L. (2015, April). *Exploring elementary teachers' knowledge and practices for model-based science instruction about the water cycle*. Paper presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL.
- Forbes, C. T., Zangori, L., Vo, T. & Schwarz, C. V. (2015, April). *Studying the impact of a design intervention on 3rd-grade students' model-based explanations for water systems*. Paper presented at the annual meeting of the National Association for Research in Science Teaching (NARST), Chicago, IL.
- Sabel, J., Forbes, C. T. (2015, April). *Elementary teachers' use of life science content knowledge to inform formative assessment instructional decisions*. Paper presented at the annual meeting of the National Association for Research in Science Teaching (NARST), Chicago, IL.
- Sabel, J., Forbes, C., & Dauer, J. (2015, November). *Using rubrics in undergraduate biology courses to advance understanding of complex biological concepts*. Paper presented at the annual meeting of the National Association of Biology Teachers (NABT), Providence, RI.

- Sabel, J., Forbes, C., & Dauer, J. (2015, July). *Using rubrics in undergraduate biology courses to advance understanding*. Poster presented at the annual meeting of the Society for the Advancement of Biology Education Research (SABER), Minneapolis, MN.
- Sabel, J., Forbes, C., & Zangori, L. (2015, November). *Preservice teachers' engagement with life science concepts within structured formative assessment assignments*. Paper presented at the Biology Education Research Symposium at the annual meeting of the National Association of Biology Teachers (NABT), Providence, RI.
- Sabel, J., Forbes, C. T., & Zangori, L. (2015, April). *Preservice teachers' use of content knowledge and formative assessment in a life science methods course*. Paper presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL.
- Sabel, J., Forbes, C.T., & Zangori, L. (2015, April). *Content knowledge and formative assessment integration in a life sciences methods course for preservice teachers*. Paper presented at the annual meeting of the National Association for Research in Science Teaching (NARST), Chicago, IL.
- Vo, T., Forbes, C. T., Zangori, L., & Schwarz, S. (2015, April). *Engaging students in scientific practices: The role of teachers in providing opportunities for student learning*. Paper presented at the annual meeting of the National Association for Research in Science Teaching (NARST), Chicago, IL.
- Zangori, L. & Forbes, C. T. (2015, November). *Exploring third-grade students' model-based explanations about plant processes*. Paper presented at the 2015 annual meeting of the National Association of Biology Teachers (NABT), Providence, RI
- Zangori, L. & Forbes, C. T. (2015, April). *Exploring 3rd-grade students' model-based explanations about the interactions between plant processes and the hydrosphere*. Paper presented at the annual meeting of the National Association for Research in Science Teaching (NARST), Chicago, IL.
- Zangori, L. & Forbes, C. T. (2015, April). *Exploring 3rd-grade students' model-based explanations about the interactions between plant processes and the hydrosphere*. Paper presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL.
- Zangori, L. Forbes, C., Schwarz, C. V., & Vo, T. (2015, April). *Supporting 3rd-grade students' model-based explanations about the water cycle: A quasi-experimental study of a curricular intervention*. Paper presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL.
- Sabel, J., Forbes, C. T., & Zangori, L. (2014, November). *Preservice teachers' use of content knowledge to inform formative assessment strategies in an integrated life sciences methods course*. Paper presented at the annual meeting of the National Association of Biology Teachers (NABT), Cleveland, OH.
- Vo, T., Forbes, C.T., Schwarz, C. (2014, October). *Fostering 3rd-grade students' use of scientific models with the water cycle: Teachers' conceptions and practices*. Paper presented at the annual meeting of the Geological Society of America (GSA), Vancouver, BC.
- Forbes, C.T., Schwarz, C., Zangori, L., & Vo., T. (2014, August). *Modeling Hydrologic Systems in Elementary Science (MoHSES) project*. Poster presented at the 2014 NSF DR K-12 PI Conference, Washington, DC.
- Forbes, C.T., Zangori, L., & Schwarz, C. (2014, April). *Mapping concepts to systems: Fostering 3<sup>rd</sup>-grade students' use of models to explain hydrologic phenomena*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Pittsburgh, PA.
- Forbes, C. T., Schwarz, C., & Zangori, L. (2014, April). *Development of an empirically grounded learning performances framework for 3rd-grade students' model-based explanations about water*. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.

- Sabel, J., Forbes, C.T., & Biggers, M. (2014, April). *Elementary teachers' implementation of formative assessment strategies: Supporting students' learning about water and Earth materials*. Poster presented at the annual meeting of the National Association for Research in Science Teaching, Pittsburgh, PA.
- Vo, T., Forbes, C.T., Zangori, L., & Schwarz, C. (2014, April). *Elementary teachers conceptions and practices: Fostering students' use of scientific models of the water cycle*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Pittsburgh, PA.
- Zangori, L., Forbes, C. T., & Schwarz, C. (2014, March). *Elementary students' model-based explanations for botanical components of the water cycle*. Poster presented at the annual meeting of the National Association of Research Teaching, Pittsburgh, PA.
- Zangori, L., Forbes, C.T., & Schwarz, C. (2014, April). *Investigating the effect of curricular scaffolds on 3rd-grade students' model-based reasoning about the water cycle*. Poster presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.
- Sabel, J., Forbes, C. T., & Zangori, L. (2013, November). *Design of an integrated teaching and learning biological sciences course for prospective elementary teachers*. Poster presented at the annual meeting of the National Association of Biology Teachers, Atlanta, GA.
- Zangori, L., Forbes, C.T., & Schwarz, C. (2013, November). *Elementary students' model-based explanations about the water cycle*. Paper presented at the annual meeting of School Science and Mathematics, San Antonio, TX.
- Forbes, C.T., Biggers, M., & Zangori, L. (2013, August). *Teachers' reasoning about students' sensemaking in elementary science learning environments*. Paper presented at the bi-annual meeting of the European Association for Research on Learning and Instruction, Munich, Germany.
- Biggers, M., Forbes, C.T., & Zangori, L. (2013, April). *Elementary teachers' ideas about, planning for, and implementation of learner-guided and teacher-guided inquiry*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Rio Grande, Puerto Rico.
- Biggers, M., Forbes, C.T., & Zangori, L. (2013, April). *Investigating variations of inquiry in elementary science classrooms: Establishing validity/reliability of a modified observation protocol*. Poster presented at the annual meeting of the National Association for Research in Science Teaching, Rio Grande, Puerto Rico.
- Forbes, C.T., Lange, K., Möller, K., Biggers, M., Laux, M., & Zangori, L. (2013, April). *A comparative study of early learners' engagement in scientific practices in the U.S. and Germany*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Rio Grande, Puerto Rico.
- Forbes, C.T., Long, K J., Kennedy, C.A., Bancroft, J., Soldat, C., Biggers, M., & Sabel, J. (2013, April). *Supporting elementary teachers' learning to use formative assessment for science: The RAES- Iowa professional development model*. Poster presented at the annual meeting of the National Association for Research in Science Teaching, Rio Grande, Puerto Rico.
- Yarker, M.B., Stanier, C.O., Forbes, C. & Park, S. (2013, January). *Challenges teachers encounter when using models to teach weather and climate in middle school classrooms*. Paper presented at the American Meteorological Society annual meeting, Austin, TX.
- Zangori, L., Forbes, C.T., & Biggers, M. (2013, April). *Elementary students' explanation construction of seed structure and function: A concurrent mixed methods study*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Rio Grande, Puerto Rico.
- Zangori, L., Forbes, C.T., & Biggers, M. (2013, April). *Elementary teachers' use of science curriculum materials to foster explanation construction*. Poster presented at the annual meeting of the National Association for Research in Science Teaching, Rio Grande, Puerto Rico.

- Zangori, L., Forbes, C.T., & Biggers, M. (2013, April). *Elementary teachers' use of science curriculum materials to promote students' sense making: An embedded mixed methods study*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.
- Yarker, M.B., Stanier, C.O., Forbes, C.T. & Park, S. (2012, December). *Strategies for effective implementation of science models into 6-9 grade classrooms on climate, weather, and energy topics*. Poster to presented at the fall meeting of the American Geophysical Union, San Francisco, CA.
- Biggers, M., Forbes, C.T., & Zangori, L. (2012, April). *Elementary teachers' curriculum design and pedagogical reasoning for supporting students' comparison and evaluation of evidence-based explanations*. Paper presented at the annual meeting of the American Educational Research Association, Vancouver, BC.
- Forbes, C.T., Biggers, M., & Zangori, L. (2012, April). *Investigating essential characteristics of scientific practices in elementary science learning environments: The Practices of Science Observation Protocol (P-SOP)*. Paper presented at the annual meeting of the American Educational Research Association, Vancouver, BC.
- Forbes, C.T., Biggers, M., & Zangori, L. (2012, April). *Toward an empirically-based learning progression: Defining progress variables and measureable levels of elementary teachers' pedagogical content knowledge for science*. Paper presented at the annual meeting of the American Educational Research Association, Vancouver, BC.
- Aguirre-Mendez, C., Promyod, N., Forbes, C.T., Biggers, M., & Zangori, L. (2012, March). *Characteristics of scientifically-oriented questions and the nature of inquiry in elementary classrooms: A multiple-case study*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Indianapolis, IN.
- Biggers, M. & Forbes, C.T. (2012, March). *Elementary teachers' ideas about, planning for, and implementation of learner-guided and teacher-guided inquiry*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Indianapolis, IN.
- Biggers, M., Zangori, L., & Forbes, C.T., (2012, March). *Exploring scientific explanations: Promoting students' Sense-making in elementary classrooms*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Indianapolis, IN.
- Forbes, C.T., Biggers, M., & Zangori, L. (2012, March). *Elementary teachers' enactment of science curriculum materials: Investigating early learners' engagement in scientific practices*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Indianapolis, IN.
- Pinney, B., Suh, J-K., Tseng, C-M., Forbes, C.T., Biggers, M., & Zangori, L. (2012, March). *Dichotomous inquiry practices: Characterizing teaching practice based on essential features of inquiry*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Indianapolis, IN.
- Yarker, M.B., Stanier, C.O., Forbes, C.T. & Park, S. (2012, March). *Mapping model to argument-based inquiry as an approach to support middle school teachers in teaching climate, weather, and energy topics*. Paper presented at the annual meeting of National Association for Research in Science Teaching, Indianapolis, IN.
- Zangori, L., Biggers, M., & Forbes, C.T. (2012, March). *This is inquiry...right? Five essential features to modify a science lesson*. Paper presented at the annual meeting of the National Science Teachers Association, Indianapolis, IN.
- Zangori, L. & Forbes, C.T., (2012, March). *Learning to support elementary students' scientific reasoning: Preservice elementary teachers and the evidence-explanation continuum*. Paper presented at

- the annual meeting of the National Association for Research in Science Teaching, Indianapolis, IN.
- Yarker, M.B., Stanier, C.O., Forbes, C.T. & Park, S. (2012, January). *Preparing middle school teachers to effectively use science models to support learning about climate, weather, and energy topics*. Poster presented at the annual meeting of the American Meteorological Society, New Orleans, LA.
- Yarker, M.B., Stanier, C.O., Forbes, C.T. & Park, S. (2011, December). *Utilizing an approach to model-based inquiry for a professional development on climate weather and energy topics for Iowa middle school teachers*. Poster presented at the annual conference of the Iowa Educational Research & Evaluation Association, Ames, IA.
- Forbes, C.T. (2011, September). *Elementary teachers' curriculum design and pedagogical design capacity for reform-based science: Research across the teacher professional continuum*. Paper presented at the bi-annual meeting of the European Science Education Research Association, Lyon, France.
- Forbes, C.T., Biggers, M., & Zangori, L. (2011, September). *Promoting and investigating elementary teachers' PCK for inquiry-based science*. Paper presented at the bi-annual meeting of the European Science Education Research Association, Lyon, France.
- Forbes, C.T. (2011, April). *The influence of curriculum-independent factors on preservice elementary teachers' adaptation of science curriculum materials*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Orlando, FL.
- Biggers, M. & Forbes, C.T. (2011, April). *Preservice elementary teachers' learning about the five essential features of classroom inquiry*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Orlando, FL.
- Forbes, C.T., Biggers, M., & Zangori, L. (2011, April). *Supporting elementary teachers' evaluation and adaptation of science curriculum materials: The PIESC3 professional development model*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Orlando, FL.
- Yarker, M. & Forbes, C.T. (2011, January). *Rethinking model-based inquiry in terms of weather and climate computer models*. Paper presented at the annual meeting of the American Meteorological Society, Seattle, WA.
- Biggers, M. & Forbes, C.T. (2011, January). *Preservice elementary teachers' learning about essential features of inquiry-based teaching and learning*. Paper presented at the annual meeting of the Association for Science Teacher Education, Minneapolis, MN.
- Forbes, C.T., Biggers, M., & Zangori, L. (2011, January). *Promoting inquiry-based elementary science through collaborative curriculum co-construction: The PIESC3 Project*. Paper presented at the annual meeting of the Association for Science Teacher Education, Minneapolis, MN.
- Forbes, C.T., Gasaway, K., Biggers, M., & Zangori, L. (2010, August). *Promoting inquiry-based elementary science through collaborative curriculum co-construction*. Poster presented at the 2nd annual Iowa Science and Mathematics Teacher Educators Summit, Grinnell, IA.
- Forbes, C.T. (2010, March). *Preservice elementary teachers' adaptation of science curriculum materials for inquiry*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Philadelphia, PA.
- Forbes, C.T., Madeira, C.A., Davis, E.A., & Slotta, J.D. (2009, April). *Activity-theoretical research on science teachers' learning: Challenges and opportunities*. Paper presented at the annual meeting of the American Educational Research Association, San Diego, CA.
- Forbes, C.T. & Davis, E.A. (2009, April). *Preservice elementary teachers' curriculum design and development of pedagogical design capacity for inquiry: An activity-theoretical perspective*.

- Paper presented at the annual meeting of the National Association for Research in Science Teaching, Garden Grove, CA.
- Forbes, C.T. & Zint, M. (2009, April). *Elementary teachers' beliefs about, perceived capacities for, and reported use of scientific inquiry to promote student learning about and for the environment*. Poster presented at the annual meeting of the National Association for Research in Science Teaching, Garden Grove, CA.
- Forbes, C.T. & Davis, E.A. (2009 January) *Preservice elementary teachers' use of science curriculum materials: Initial attempts at curriculum design for inquiry-oriented science teaching*. Paper presented at the annual meeting of the Association for Science Teacher Education, Hartford, CT.
- Forbes, C.T. & Davis, E.A. (2008, March). *Beginning elementary teachers' learning to use questions and questioning in inquiry-oriented science teaching: A longitudinal study*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Baltimore, MD.
- Forbes, C.T. & Davis, E.A. (2008, January). *Preservice elementary teachers' curricular role identity for science teaching: A multi-year study*. Poster presented at the annual meeting of the Association for Science Teacher Education, St. Louis, MO.
- Forbes, C.T. & Davis, E.A. (2007, April). *Beginning elementary teachers' learning through the use of science curriculum materials: A longitudinal study*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, New Orleans, LA.
- Davis, E.A., Beyer, C., Forbes, C.T., Stevens, S. (2007, April). *Promoting pedagogical design capacity through teachers' narratives*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, New Orleans, LA.
- Forbes, C.T. & Davis, E.A. (2007, January). *Exploring preservice elementary teachers' role identity development in respect to the use of science curriculum materials*. Paper presented at the annual meeting of the Association for Science Teacher Education, Clearwater Beach, FL.
- Forbes, C. T. & Davis, E.A. (2006, June). *Mapping the teacher professional continuum through the use of science curriculum materials: Novice elementary teachers' curriculum-specific learning and role identity development*. Poster presented at the 4th Annual CCMS Knowledge Sharing Institute, Ann Arbor, MI.
- Forbes, C.T. & Davis, E.A. (2006, January). *Exploring preservice elementary teachers' critique and adaptation of science curriculum materials in respect to socioscientific issues*. Paper presented at the annual meeting of the Association for Science Teacher Education, Portland, OR.
- Forbes, C.T. (2004, March). *Peer mentoring: Shared experiences help new teachers succeed*. Paper presented at the STEMTEC Teacher Preparation PI Conference, Washington, DC.
- Forbes, C.T., Heppert, J.A., & Webber, G.K. (2002, March). *Informal learning environments as resources for supporting early career teachers in inquiry-based instruction*. Paper presented at the STEMTEC Pathways to Change Conference, Washington, DC.

#### *Other Conference Activities*

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|---|------|
| Invited participant, <i>International Workshop on Scientific Modeling</i> , University of Augsburg, Germany, German Research Foundation (DFG).  | 2015 |
| Invited participant, <i>Workshop: Tightening Research-Practice Connections: Taking ISLS findings to Public Debate</i> , International Conference of the Learning Sciences, Boulder, Colorado. | 2014 |
| Invited participant, <i>Writing an Application for an IES Grant: A Workshop</i> , 2013 AERA meeting, Institute for Education Sciences.  | 2013 |
| Invited participant, Doctoral Consortium, International Conference of the Learning Sciences, Utrecht, the Netherlands.  | 2008 |

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Facilitator, *Teacher Identity & Use of Curriculum Materials*, 2006 CCMS Knowledge Sharing Institute, Ann Arbor, MI. 2006  
 Facilitator, *Science Education Policy*, 2006 CCMS Knowledge Sharing Institute, Ann Arbor, MI. 2006

## POST-SECONDARY TEACHING EXPERIENCE

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SCIL/NRES/AECN 109 Water in Society (Undergrad, UNL) Planned (Sp 2017)  
 NRES 898 Teaching and Learning about Water Systems (Grad, UNL) Summer, 2015  
 AGRI/NRES 103 Introduction to Agriculture and Natural Resource Issues (Undergrad, UNL) Fall, 2014  
 07E:158 Teaching and Learning in the Biological Sciences (Undergrad, U. of Iowa) Fall, 2013  
 SU/WP Inquiry Learning and Teaching in Elementary Science Classrooms in the United States (Undergrad, U. of Augsburg, Germany) Summer, 2013  
 MoHSES Teacher Professional Development Workshop (Grad, U. of Iowa) Summer, 2013  
 07E:340 Advanced Topics in Teaching and Learning (RAES-Iowa Teacher Professional Development Workshop, Grad, U. of Iowa) 2012-2014  
 07S:355/356 Research Apprenticeship in Science Education (Grad, U. of Iowa) Spring, 2011, 2013  
 07S:255 Inquiry in Science Learning Environments (Grad, U. of Iowa) Fall, 2010, 2012  
 07S:254 Theory and Research on Curriculum Materials for Science (Grad, U. of Iowa) Spring, 2012  
 PIESC<sup>3</sup> Teacher Professional Development Workshop (Grad, U. of Iowa) Summer, 2011-2012  
 07E:162 Methods: Elementary School Science (Undergrad, U. of Iowa) 2010-2014  
 07E/S:350 Seminar Science Education (Grad, U. of Iowa) Spring, 2010  
 07S:151 Science Teaching & Practicum with Early Learners (Undergrad, U. of Iowa) Fall 2009, 2011  
 EDUC 421, Teaching of Science in Elementary School (Undergrad, U. Michigan) 2004-2007  
 KCETP Microbiology Teacher Professional Development Workshops (Grad, U. Kansas) 2001, 2002  
 Physics 116 Laboratory (Undergrad, U. Kansas) Fall, 2001  
 Biology 102 Laboratory (Undergrad, U. Kansas) 1998-1999

## HONORS, AWARDS, AND RECOGNITION

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NARST Early Career Research Award 2014  
 Nominee, 2015 AERA Div. C Early Career Award 2014  
 NARST/NSTA "Research worth Reading" recognition for paper entitled 'Fostering student sense-making in elementary science learning environments: Elementary teachers' use of science curriculum materials to promote explanation-construction (Zangori, Forbes, & Biggers, 2013) 2014  
 Nominee, NARST Outstanding Paper Award 2013  
 Summer Research Fellowship, University of Iowa International Programs 2012  
 Old Gold Summer Fellowship, University of Iowa 2010  
 Nominee, Dimond Outstanding Dissertation Award 2010  
 University of Michigan School of Education  
 Rackham Predoctoral Fellowship Awardee 2008-2009  
 University-wide fellowship that provides one year of support to advanced doctoral candidates currently working on dissertation research. Students

are nominated by their departments and approximately 72 fellowships are awarded out of 250 nominees each year.

## **ADVISEES AND GRADUATE STUDENT COMMITTEES**

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### *Postdoctoral Researchers*

1. Devarati Bhattacharya – Ph.D., Science Education, University of Minnesota (2015)

### *Current and Past Graduate Advisees*

1. Laura Zangori, Ph.D. Science Education - 2015 – Assistant Professor of Science Education, University of Missouri-Columbia \*participant, 2013 Sandra K. Abell Institute for Doctoral Students
2. Mandy Biggers, Ph.D. Science Education- 2013 – Assistant Professor of Science Education, Penn St. University \*participant, 2011 Sandra K. Abell Institute for Doctoral Students
3. Dave Pierson, M.S. Science Education – 2013 – Secondary science teacher, Mediapolis School District, Iowa
4. Jaime Sabel (doctoral) – University of Nebraska Science Education Doctoral Student
5. Tina Vo (doctoral) - University of Nebraska Science Education Doctoral Student
6. Molly Brandt (masters) - University of Nebraska Masters of Applied Science
7. Ashley (McKinzie) Peterson (masters) - University of Nebraska Masters of Natural Resource Science
8. Tyler Wolken (masters) - University of Nebraska Masters of Applied Science

### *Doctoral Committees*

1. Jaime Sabel (current, Chair) – UNL Science Education Ph.D. Student
2. Tina Vo (current, Chair) - UNL Science Education Ph.D. Student
3. Theresa Haack (current, member) – UNL Ed.D. Student
4. Zangori, Laura, Ph.D. (2015, Chair). *Exploring 3rd-Grade Students' Model-Based Reasoning about Plant Growth and Development*
5. ChingMei Tseng, Ph.D. (2014, Member). *The Effect of the Science Writing Heuristic Approach Reflected in Students' Critical Thinking Skills*
6. Mandy Biggers, Ph.D. (2013, Chair). *Elementary Teachers' Ideas about, Planning for, and Implementation of Learner-directed and Teacher-directed Inquiry*
7. Morgan Yarker, Ph.D. (2013, Co-Chair). *Mapping Argument-Based Inquiry to Model-Based Inquiry Approaches: Teachers' Use of Science Models in Middle-School Classrooms about Climate, Weather, and Energy Concepts*
8. Nattida Promyod, Ph.D. (2013, Member). *Investigating the Shifts in Thai Teachers' Views of Learning and Pedagogical Practices while Adopting an Argument-based Inquiry Approach*
9. Saeyeol Yoon, Ph.D. (2012, Member). *Dual Processing and Discourse Space: Exploring Fifth Grade Students' Language, Reasoning, and Understanding through Writing*
10. Matt Benus, Ph.D. (2011, Member). *The Teacher's Role in the Establishment and Refinement of Dialogue Over Time in Classrooms using Science Argumentation*
11. Juan Diaz, Jr., Ph.D. (2011, Member). *Examining Student-generated Questions in an Elementary Science Classroom*
12. Ying-Chih Chen, Ph.D. (2011, Member). *Examining the Integration of Talk and Writing for Student Knowledge Construction through Argumentation*
13. William Bennet, Ph.D. (2011, Member). *Multimodal Representation Contributes to the Complex Development of Science Literacy in a College Biology Class*



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14. Jeong Yoon Jang, Ph.D. (2011, Member). *The Effect of Using a Structured Reading Framework on Middle School Students' Conceptual Understanding Within The Science Writing Heuristic Approach*

#### *Masters Thesis Committees*

1. Ashley (McKinzie) Peterson, M.S. (current, Chair) - UNL Masters of Natural Resource Science
2. Tyler Wolken, M.A.S. (current, Co-Chair) - UNL Masters of Applied Science
3. Molly Brandt, M.A.S. (current, Chair). *Elementary Students' Knowledge about STEM Dimensions of Agriculture*
4. Ashley Alred, M.S. Natural Resource Sciences (current, Member). *Undergraduates' Learning and Reasoning about Agricultural and Natural Resources Socioscientific Issues*
5. David Pierson, M.S. Science Education (2013, Chair). *Elementary Teachers' Assessment Actions and Elementary Science Education: Formative Assessment Enactment in Elementary Science*

#### *Visiting Students*

1. Mira Laux (science education Ph.D. student, University of Münster, Germany; Summer 2012)

## **SERVICE AND PROFESSIONAL ACTIVITIES**

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### *Program, Department, College, and University*

UNL Research Council	2015-Present
Graduate Committee, CASNR Master of Applied Science Program	2015-Present
Undergraduate Committee, School of Natural Resources	2015-Present
Planning Committee Member, 2015 UNL STEM Education Research Retreat	2015
Chair, K-12 Curriculum Development Specialist Search Committee	2015-Present
Organizer and Facilitator, <i>Grading Homework, Exams, Lab Reports or Problem Sets</i> workshop, UNL Campus-wide Workshops for Graduate Teaching Assistants	2014, August
Science and Ag Literacy Extension Educator Search Committee, UNL Extension Prairie Corridor on Haines Branch Committee	2014 2014-Present
Organizer, Graduate Student Research Symposium (UI College of Education)	2010-2013
UI COE Elementary Science Coordinator – Elementary Teacher Education Program Committee	2009-2013
UI COE Faculty Search Committee, Tenure-track Assistant Professor Position, Science Education	2010-2011
UI COE Faculty Search Committee, Department of Psychological and Quantitative Foundations	2011
UI COE Ad-Hoc Committee to develop online Elementary Education M.A. program	2009
UI Review Committee, 2013 UI International Programs Summer Research Fellowship	2012
Organizer and Facilitator, RefWorks workshop, UI COE faculty and graduate students	2010, May
Organizer and Facilitator, Atlas.Ti workshop, UI COE faculty and graduate students	2010, May

### *State, National, and International*

Grant Proposal Reviewer, National Science Foundation	2010-present
<ul style="list-style-type: none"><li>• Division of Research on Learning (DRL) - Discovery-Research K-12, Math-Science Partnership/STEM + Computing Partnerships, CAREER, REESE</li><li>• Division of Undergraduate Education (DUE) - Improving Undergraduate STEM Education: Pathways into Geoscience (IUSE: GEOPATHS)</li></ul>	
Grant Proposal Reviewer, Nebraska Coordinating Commission for Postsecondary	2015

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Education (CCPE), Title IIA Teacher Quality grants program	
Editorial Board member, <i>Journal of Research in Science Teaching</i> (JRST)	2012-2015
National Association for Research in Science Teaching Outstanding Doctoral Research Award Selection Committee	2015-present
National Association for Research in Science Teaching JRST Award Committee	2012-2013
Association for Science Teacher Education Oversight Committee	2008
Senior Reviewer, International Conference of the Learning Sciences	2014
Reviewer, International Conference of the National Association for Research in Science Teaching (NARST)	2007-present
Reviewer, International Conference of the Association for Science Teacher Education	2009
Ad-hoc Journal Reviewer	2008-present
<i>American Biology Teacher, Curriculum Inquiry, Educational Researcher, Elementary School Journal, International Journal of Science Education, Journal of Educational Psychology, Journal of Environmental Education, Journal of Teacher Education, Science Education, Teaching and Teacher Education</i>	
NARST Conference New Member Mentor	2015
Reviewer, Intel Science Talent Search (Intel STS), Society for Science & the Public	2014
Invited Participant, STEM Strategy Meeting, Nebraska Dept. of Education	2015
<i>State and Community Outreach</i>	
Organizer, <i>STEMming into the Future</i> K-12 outreach event	2015-present
<ul style="list-style-type: none"><li>• 350,000+ attendees at the Nebraska State Fair (2015)</li><li>• 35+ organizations involved from UNL, museums, educational entities, etc.</li></ul>	
Volunteer, UNL School of Natural Resources annual <i>NaturePalooza</i> outreach event	2014, 2015
Professional Development, NE Educational Service Units, Science Cadre meetings	2014-present
<i>Consulting</i>	
External evaluator, Nutrients for Life K-12 STEM curriculum	2015
Curriculum materials reviewer, Learning Design Group, Lawrence Hall of Science	2015
Science4Us, advisory board member and curriculum materials reviewer	2011-2014
P-SOP Training, NSF MSP evaluation team, Auburn University	2012, Nov
P-SOP Training, Workgroup Möller, PLUS Project, University of Münster, Germany	2012, January
Teacher mentor and supervisor, Real World Externships for STEM Teachers program, Iowa Math and Science Education Partnership	2011-2012
Curriculum materials reviewer, Biological Science Curriculum Study (BSCS)	2011, 2008
Implementation team for field trials of ISIOP observation protocol	2010
Education Development Center (EDC)	
<i>Memberships</i>	
American Educational Research Association (AERA)	
International Society of the Learning Sciences (ISLS)	
National Association for Research in Science Teaching (NARST)	
National Science Teachers Association (NSTA)	
Nebraska Association of Teachers of Science (NATS)	