

ANDY R. CAVAGNETTO

CONTACT INFORMATION

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EDUCATION

- 2006 PhD., Science Education, University of Iowa, Iowa City, IA. *Dissertation:* Setting the Question for Inquiry: The Effects of Whole Class vs. Small Group on Student Academic Achievement in Elementary Science.
Advisor: Dr. Brian Hand
- 2001 M.S. Education, Emphasis: Science, University of Wisconsin River Falls, River Falls, WI. *Thesis:* Isolation and Sequencing of Cytochrome Oxidase from the Archaeobacterium *Thermoplasma acidophilum*.
Advisor: Dr. Karen Klyczek
- 1998 University of Wisconsin – Eau Claire, B.S. Biology with Honors.

PROFESSIONAL APPOINTMENTS

- 2012 - Associate Professor, Dept. Teaching & Learning/School of Biological Sciences, Washington State University, Pullman, WA
- 2006 - 2012 Assistant Professor, Graduate School of Education, Binghamton University – State University of New York, Binghamton, NY
- 2003 – 2006 Research Assistant/Teaching Assistant, Dept. Teaching & Learning/Biological Sciences, University of Iowa, Iowa City, IA
- 2002 – 2003 Secondary Science Teacher, Arlington High School, Arlington, NY
- 2001 – 2002 Secondary Science Teacher, Park High School, Cottage Grove, MN

REFEREED PUBLICATIONS

Cavagnetto, A. R., & ¹Smith, M. (under review). Presentation of science and engineering practices in elementary level science trade books: An examination of trends across grade level bands. *Canadian Journal of Science, Mathematics, and Technology Education*.

¹Smith is a recent graduate of WSU's teacher education program and is now a practicing elementary teacher. This study began during her senior year at WSU. I contributed to all aspects of this study and wrote the manuscript.

Arneson, J., Woodbury, J. Anderson, J., Collins, L., **Cavagnetto, A.**, Davis, W. B., Offerdahl, E. G. (accepted with minor revisions). Garden variety mutations: Using primary data to understand the Central Dogma in large-lecture introductory biology. *CourseSource*. *I co-wrote the grant to fund this work and was involved in conceptualization of the instruction, data collection, and editing of the manuscript.*

Cavagnetto, A. R., Premo, J., Coleman, Z., & Juergens, K. (2022). Accuracy and idea consideration: A study of small group interaction in biology. *CBE Life-Sciences*. <https://doi.org/10.1187/cbe.21-03-0067>

I wrote the grant to fund this work and was involved in every aspect of this work except the talk coding. I led the writing of the manuscript.

Arneson, J., Woodbury, J. Anderson, J., Collins, L., **Cavagnetto, A.**, Davis, W. B., Offerdahl, E. G. (2022). Splicing it together: Using primary data to explore RNA splicing and gene expression in large-lecture introductory biology. *CourseSource*. <https://qubeshub.org/community/groups/coursesource/publications?id=2863&v=1>

I co-wrote the grant to fund this work and was involved in conceptualization of the instruction, data collection, and editing of the manuscript.

Premo, J., **Cavagnetto, A. R.**, Collins, L., Davis, W. B., Offerdahl, E. (2021). Discourse remixed: Using interdependency to shift student learning through talk. *Journal of Experimental Education*. <https://doi.org/10.1080/00220973.2021.1993771>

Cavagnetto, A. R., Hand, B., & Premo, J. (2020). Supporting Student Agency in Science. *Theory into Practice*, 59(2), 128-138. [doi=10.1080/00405841.2019.1702392](https://doi.org/10.1080/00405841.2019.1702392)
I led all aspects of this article.

Collins, L. B., **Cavagnetto, A. R.**, Ferry, N. C., Adesope, O. O., Baldwin, K., Morrison, J., & Premo, J. T. (2019). May I have your attention: An analysis of teacher responses during a multi-year professional learning program. *Journal of Science Teacher Education*, 30(6), 549-566. <https://doi.org/10.1080/1046560X.2019.1589846>

I was heavily involved in all aspects of the study. I was the intellectual lead on the manuscript, was the PI on the grant that funded this study, and am corresponding author.

- Premo, J., **Cavagnetto, A. R.**, Kurtz, K., & Honke, G. (2019). Categories in Conflict: Combating the application of an intuitive conception of inheritance with category construction. *Journal of Research in Science Teaching*, 56(1), 24-44. DOI: [10.1002/tea.21466](https://doi.org/10.1002/tea.21466)
I contributed to the data collection, analysis, theoretical framing and editing of the manuscript. I served as Co-PI on the Institute of Education Sciences grant that funded this work.
- Premo, J., **Cavagnetto A. R.**, & Davis, W. (2018). Promoting Collaborative Classrooms: The impacts of interdependent cooperative learning on undergraduate interactions and achievement. *CBE-Life Science Education*, 17:ar32, 1-16.
<https://www.lifescied.org/doi/10.1187/cbe.17-08-0176>
I contributed to the conceptualization of the study, data collection, theoretical framing and editing of the manuscript and wrote the majority of the internal grant that funded this project.
- Premo, J., & **Cavagnetto, A. R.** (2018). Priming Students for Whole-Class Interaction: Using interdependence to support behavioral engagement. *Social Psychology in Education*, 21(4), 915-935. <https://doi.org/10.1007/s11218-018-9445-y>
I contributed to conceptualization of the study, theoretical framing of the manuscript, and editing the manuscript.
- Premo, J., Lamb, R., & **Cavagnetto, A. R.** (2018). Conditional cooperators: Student prosocial dispositions and their perception of the classroom social environment. *Learning Environments Research*, 21(2), 229-244. <https://doi.org/10.1007/s10984-017-9251-z>
I was involved in the theoretical framing of the study and edited the manuscript.
- Premo, J., **Cavagnetto, A. R.**, & Lamb, R. (2018). The Cooperative Classroom Environment Measure (CCEM): Refining a Measure that Assesses Factors Motivating Student Prosociality. *International Journal of Science and Mathematics Education*, 16(4), 677-697. DOI: [10.1007/s10763-017-9804-8](https://doi.org/10.1007/s10763-017-9804-8)
I was involved in the theoretical framing of the study, provided feedback on drafts of survey items, and edited the manuscript.
- Sundararajan, N. K., Adesope, O. O., & **Cavagnetto, A. R.** (2018). The Process of

Collaborative Concept Mapping in Kindergarten and the Effect on Critical Thinking Skills. *Journal of STEM Education*, 19(1), 5-13.

<https://www.learntechlib.org/p/182981/>

I was involved in conceptualization of the study, editing of the manuscript, and established the relationships with the schools and teachers where the study was conducted.

Adesope, O. O., **Cavagnetto, A. R.**, Hunsu, N. J., Anguiano, C., & Lloyd, J. (2017). Comparative Effects of Computer-Based Concept Maps, Refutational Texts, and Expository Texts on Science Learning. *Journal of Educational Computing Research*, 55(1), 46-69.

<https://journals.sagepub.com/doi/abs/10.1177/0735633116654163>

I was involved in results interpretation, writing and editing the manuscript.

Cavagnetto, A. R., & Kurtz, K. J. (2016). Promoting Students' Attention to Argumentative Reasoning Patterns. *Science Education*, 100(4), 625-644.

<https://doi.org/10.1002/sce.21220>

I lead study conceptualization, data collection, analysis, and writing efforts.

Hand, B., **Cavagnetto, A. R.**, Chen, Y. C., & Park, S. (2016). Moving Past Curricula and Strategies: Language and the Development of Adaptive Pedagogy for Immersive Learning Environments. *Research in Science Education*, 46(2), 223-241.

<https://link.springer.com/article/10.1007/s11165-015-9499-1>

I contributed to the theoretical framing, writing and editing of the manuscript.

Lamb, R., **Cavagnetto, A. R.**, & Akmal, T. (2016). Examination of the Nonlinear Dynamic Systems Associated with Science Student Cognition While Engaging in Science Information Processing. *International Journal of Science and Mathematics Education*, 14(Suppl 1). pp 187-205.

<https://doi.org/10.1007/s10763-014-9593-2>

I contributed to the theoretical framing and editing of the manuscript.

Washburn, E. & **Cavagnetto, A. R.** (2013). Using argument as a tool for integrating science and literacy. *The Reading Teacher*, 67(2), 127-136.

<https://doi.org/10.1002/TRTR.1181>

Equal authorship. I development of the argument cycles framework on which this article reports and was involved in drafting and editing the manuscript.

Cavagnetto, A. R. (September, 2011). The multiple faces of argument for school science. *Science Scope*, 35(1), 24-27. <https://eric.ed.gov/?id=EJ944040>

Cavagnetto, A. R., Hand, B., & Norton-Meier, L. (2011). Negotiating the inquiry question: A comparison of whole class and small group strategies in grade five science classrooms. *Research in Science Education*, 41, 193-209.

[DOI: 10.1007/s11165-009-9152-y](https://doi.org/10.1007/s11165-009-9152-y)

I lead study conceptualization, data collection, analysis, and writing efforts.

Cavagnetto, A. R. (2010). Argument to foster scientific literacy: A review of argument interventions in K-12 contexts. *Review of Educational Research*, 80, 336-371.

<https://doi.org/10.3102%2F0034654310376953>

Cavagnetto, A. R., Hand, B., & Norton-Meier, L. (2010). The nature of elementary student science discourse in the context of the science writing heuristic approach. *International Journal of Science Education*, 32, 427-449.

<https://doi.org/10.1080/09500690802627277>

I lead study conceptualization, data collection, analysis, and writing efforts.

Hansen-Thomas, H. & **Cavagnetto, A. R.** (2010). Mainstream teacher attitudes of middle school ELLs. *Bilingual Research Journal*, 33, 249-266.

<https://doi.org/10.1080/15235882.2010.502803>

I conducted data analysis, wrote the methods and results section of the manuscript and edited the other sections.

McGrann, R., Jones, W., Gal, S., **Cavagnetto, A. R.,** Brennan, D., & O'Brien, T. (2010). Go Green- Using Sustainability Engineering in a Middle School Summer Program. In *American Society for Engineering Education*. American Society for Engineering Education. *I was involved in conceptualizing the Summer Program and led evaluation efforts.*

Cavagnetto, A. R. (Nov./Dec. 2008). Can science be a real context for language learning? *Primary Science*, 105, 29-32.

Cavagnetto, A. R., Dunkhase, J., Yager, R. E., & Burketta, V. (2005). Africa-America Institute–University of Iowa professional development workshop: A distance learning approach to science literacy in Africa. *Bulletin of Science, Technology & Society*, 25, 446-454. *I led study conceptualization, data collection, analysis, and writing efforts.*

BOOK CHAPTERS

Hand B., **Cavagnetto A.,** Norton-Meier L. (2019) *Immersive approaches to science argumentation and literacy: What does it mean to “live” the languages of science?* In V. Prain & B. Hand (Eds.), *Theorizing the Future of Science Education Research*. Contemporary Trends and Issues in Science Education, vol 49. Springer, Cham

Lamb, R., **Cavagnetto, A.**, Adesope, O., Yin, L., French, B., & Taylor, M. (2016). *Artificially intelligent systems in education a tool for the future*. In R. Lamb & D.D. McMahon (Eds.), *Educational and Learning Games: New Research*. New York, NY: NOVA Publishing.

I contributed to the theoretical framing, writing and editing of the chapter.

Cavagnetto, A. R., & Hand, B. (2011). *The importance of embedding argument within science classrooms*. In K. Myint (Ed.), *Perspectives on Scientific Argumentation: Theory, Practice and Research*. Dordrecht, The Netherlands: Springer.

I lead the theoretical framing, writing and editing of the manuscript.

Norton-Meier, L. A., Hand, B., **Cavagnetto, A. R.**, Akkus, R., & Gunel, M. (2009). *Pedagogy, implementation, and professional development for teaching science literacy: How teachers and students know and learn*. In L. D. Yore, B. Hand, & M. C. Shelley (Eds.), *Gold Standard(s) of Quality Research in Science Literacy: Science Education, Reading, Statistics, and Other Adventures in Science-Based Research*. Dordrecht, The Netherlands: Springer.

I contributed to the theoretical framing, writing and editing of the manuscript.

Cavagnetto, A. R. (2008). Factors influencing implementation of the science writing heuristic in two elementary classrooms. In B. Hand (Ed.), *Science Inquiry, Argument and Language: The Case for the Science Writing Heuristic* (pp. 37-54). Rotterdam: Sense Publishers.

IN PROGRESS

Cavagnetto, A. R., & Hand, B. (In progress). The pedagogy of negotiation: Moving from replicative to generative learning environments.

Cavagnetto, A. R., Roach, D., Ledezma, N., Winder, L., Duffy, L., Ferroggiaro, A., Roach, D., Offerdahl, E., Arneson, J., Davis, W.B., & Woodbury, J. (In progress). Group Dynamics: Examining Group Member Roles in Small Group Data-Based Argumentation Tasks in the context of a Large-Lecture Course.

FUNDED GRANTS AND AWARDS

EXTERNAL GRANTS & AWARDS

2019 - NSF REU: *The RISE Program - Research in Interdisciplinary STEM Education*
OFFERDAHL, E. G. (PI), Kelton, M. L. (Co-PI), Kelp, N. C. (Senior Personnel),
Cavagnetto, A. R. (Senior Personnel), Lessmann, J. J. (Senior Personnel),
Roth-McDuffie, A. (Senior Personnel), Mixter, P. F. (Senior Personnel),

Buckley, P. T. (Senior Personnel), Rollwagen-Bollens, G. (Senior Personnel), Davis, W. B. (Senior Personnel). (\$359,074.00 for 3 years).

- 2018 - 2022 NSF IUSE: *Investigating Deliberative Argumentation in Large-Lecture Biology*. Offerdahl (PI), **Cavagnetto** (Co-PI). (\$298,833)
The grant was drafted jointly by Offerdahl and me –each contributing equal time, effort, and content.
- 2012 - 2016 Institute of Education Sciences (IES) –Cognition & Instruction: *Enhancing Learning and Transfer of Science Principles via Category Construction*. Kurtz (PI), **Cavagnetto** (Co-PI). (\$757,427; \$281,723 to WSU)
I was involved in all aspects of the grant application and was involved in study design, supported data collection and conducted some analysis. My lab led development of category construction materials for the project.
- 2012 - 2015 Office of Superintendent of Public Instruction: *Enhancing Understanding of Concepts and Practices of Science (EUCAPS)*. **Cavagnetto** (PI). (\$541,728)
My lab led professional learning efforts, data analysis, and writing. I was also heavily involved in data collection.
- 2009 - 2011 CSS Workforce New York: *Broome-Tioga Go Green Institute*. Jones (PI), **Cavagnetto** (Co-PI). (\$135,000)
I worked with institute teachers to guide the nature of the activities at the institute and led program assessment.
- 2008 New York Department of Education: *The Go Green Institute at Binghamton University*. Jones (PI), **Cavagnetto** (Co-PI). (\$67,000)
I worked with institute teachers to guide the nature of the activities at the institute and led program assessment.

INTERNAL GRANTS & AWARDS

- 2018 - 2020 College of Veterinary Medicine Educational Research Grant: *Leveraging Collaborative Writing and Peer Review to Promote Learning in Prosocial Classroom Environments*. Davis (PI), **Cavagnetto** (co-PI), Premo (co-PI), Collins (co-PI), & Dunn (co-PI). (\$7713). *I am involved with conceptualization of the project, data analysis and writing.*
- 2017 - 2020 Boeing Distinguished Professorship: *Integrating Argumentation-to-Learn in Large Lecture Biology*. **Cavagnetto** (PI). (\$50,000)

- 2017 - 2018 College of Veterinary Medicine Educational Research Grant: *Put Up Your Dukes: Investigating Best Practices for Preparing Students for Scientific Argumentation*. Offerdahl (PI), **Cavagnetto** (Co-PI). (\$7499)
Both Offerdahl and I are involved in every major aspect (conceptualization of study, data collection, analysis, and writing) of the project.
- 2016 - 2017 College of Veterinary Medicine Educational Research Grant: *Fostering Increased Scientific Collaboration by Seeding Prosocial Experiences within Laboratory Environments*. Davis (PI), **Cavagnetto** (Co-PI). (\$7992)
Both Davis and I are involved in every major aspect (conceptualization of study, data collection, analysis, and writing) of the project.
- 2009 Binghamton University Research Foundation Minigrant Award: *Travel to IES*. **Cavagnetto** (PI). (\$1000)
- 2007 Binghamton University College of Education Seed Grant: *Continuation and Future Development of the Science Writing Heuristic Implementation Project in Rural Iowa and Greater Binghamton*. **Cavagnetto** (PI). (\$4000)
- 2007 Binghamton University College of Education: *Influence of Group Interaction on Elementary Language Learners*. Hansen-Thomas (PI), **Cavagnetto** (Co-PI). (\$1000)
I was involved in data collection and analysis.
- 2007 New York State United University Professionals: *Individual Development Award: Conference Travel*. (\$942)

UNFUNDED GRANT APPLICATIONS AT WSU

- 2017 Fulbright U.S Core Scholars Program. *Examining and Supporting Student Talk in Large Lecture Undergraduate Biology*.
- 2017 NSF NRT - Innovations in Graduate Education track: Transforming Undergraduate and Graduate Education through a Graduate Teaching Certificate Program. Offerdahl (PI), **Cavagnetto** (Co-PI). (\$488,892)
The grant was drafted with approximately 60/40 split between PI (Offerdahl) and co-PI (Cavagnetto).
- 2016 NSF IUSE: *Leveraging the Language Practices of Science: Adapting the Science Writing Heuristic to Large-Scale Undergraduate Biology Lecture Courses*. Offerdahl (PI), **Cavagnetto** (Co-PI). (\$299,750)

The grant was drafted jointly by Offerdahl and me –each contributing approximately equal time, effort, and content.

- 2016 Spencer Foundation: *Partnership for Achieving Student Success*. **Cavagnetto** (PI). (\$385,814)
I was the intellectual lead on this proposal and led writing efforts. A number of co-PI's contributed to some sections of the proposal.
- 2012 IES: *Supporting Instructional Talk through Intelligent Avatar Simulation*. **Cavagnetto** (PI). (\$1,500,000)
I was the intellectual lead on this proposal and led writing efforts. A number of co-PI's contributed to some sections of the proposal.

INVITED PRESENTATIONS

- 2019 University of Cambridge, Cambridge Educational Dialogue Research Group Brown Bag series: *In Search of Deliberative Talk*. June 28, 2019. Cambridge, England.
- 2019 University of Leeds School of Education Seminar Series: *Working Toward Guiding Principles for Next Generation Science Instruction*. May 14, 2019. Leeds, England.
- 2019 Durham University Department of Biosciences Brown Bag Discussion with the Teaching Enhancement Group. May 10, 2019. Durham, England.
- 2019 Durham University School of Education Research Seminar Series: *Studies of Discourse in Undergraduate Biology*. March 6, 2019. Durham, England.
- 2019 Queen's University Belfast Graduate School of Education Guest Lecture: *Seeding and Planning for Dialogue in Science Classrooms*. February, 19, 2019. Belfast, Northern Ireland.
- 2016 Knowledge Bases and Learning Environments Workshop. *Generational poverty in rural Southeastern Washington State: Examining prosocial classroom environments to promote change*. Iowa City, IA.
- 2016 Lewiston-Clarkston Valley Resiliency Collaborative. *Recognizing environment: Seeding prosocial attitudes and behaviors in schools*. Clarkston, WA.

- 2014 WSU CAS Mathematics Education Seminar. *Immersion in argument-based inquiry: Using argument as an epistemic tool in science*. Pullman, WA.
- 2014 WSU Department of Education Psychology Seminar. *Instigating argument in science classrooms*. WSU Educational Psychology Seminar. Pullman, WA.
- 2013 WSU College of Education Research Brown Bag Seminar. *Instigating argument in science classrooms*. Pullman, WA.
- 2008 University of Iowa Science Education Seminar. *Transitioning from graduate school to an academic position*. Iowa City, IA.
- 2006 Syracuse University Science Education Action Research Fair. *Effective dialogical interaction: A two-year case study of two grade five science teachers*. Syracuse, NY.

PRESENTATIONS (PRESENTER)

- Cavagnetto, A. R.**, ¹Ledezma, N., ¹Harrold, A., *Ferroggiaro, A., *Call, B., Roach, D., *Duffy, L., Arneson, J., Offerdahl, E., & Woodbury, J. (March 2022). Group Dynamics: Examining Group Member Roles in Small Group Data-Based Argumentation Tasks in the context of a Large-Lecture Course. Paper presented at the Annual Meeting of the National Association of Research in Science Teaching. Vancouver, B.C.
*¹NSF REU students *Undergraduate research assistants in Cavagnetto Lab*
- Cavagnetto, A. R.**, *Prestis, O., *Hackett, A., Collins, L., Arneson, J., Woodbury, J., Davis W. B., Offerdahl, E. (April, 2021). Group interaction patterns during data interpretation problems in undergraduate biology. Paper presented at Annual Meeting of the National Association of Research in Science Teaching. Virtual via Zoom.
**Undergraduate research assistants in Cavagnetto Lab*
- Cavagnetto, A. R.** (Spring 2020). Is lecture poor instructional practice? School of Biological Sciences Biolunch.
- Cavagnetto, A. R.**, Hand, B., & Premo, J. (March, 2019). Reframing classroom discourse through the lens of benefit to cost ratios. Paper presented at the New Perspectives in Science Education International Conference. Florence, Italy.
- Cavagnetto, A. R.**, Premo, J., and Davis, W. (2018). With a Little Help from My Friends: Student collaborative engagement within a cooperative CURE. Paper presented at the 2018 Society for the Advancement of Biology Education Research's (SABER) Western Conference. Irvine, CA.

- Cavagnetto, A. R., & Premo, J.** (2017). A Theoretical Perspective and Initial Studies on Prosocial Science Classrooms. Poster presented at the 12th Conference of the European Science Education Research Association. Dublin, Ireland.
- Cavagnetto, A. R., Morrison, J., Adesope, O. O., Baldwin, K., & Ferry, N.** (April, 2017). Exploring Teacher Perceptions of the Enhancing Understanding of Concepts and Practices of Science (EUCAPS) Project. Paper presented at the National Association for Research in Science Teaching International Conference, San Antonio, TX.
- Premo, J., **Cavagnetto, A. R., & Nitta, K.** (April, 2017). Structuring learning tasks to promote whole-class cooperative behavior. Paper presented at the National Association for Research in Science Teaching International Conference, San Antonio, TX.
Premo was unable to attend so I presented the paper.
- Cavagnetto, A. R.** (2015). Supporting teachers' transition to argument-based inquiry: A report on the EUCAPS project. Paper presented at the 2nd International Conference on Argument-Based Inquiry. Spokane, WA.
- Cavagnetto, A. R., Fry, J., Lee, D., Heath, T., Nedrow, L., Gotch, C., Baldwin, K., Adesope, O. O., Morrison, J. Boatman, G.** (October, 2014). Examining key aspects of K-12/university partnerships. Workshop presentation at the Washington Science Teachers Association Annual Conference. Spokane, WA.
- Cavagnetto, A. R.** (September, 2014). Using an evolution lens to examine classroom community. Paper presented at the Science Education at the Crossroads Conference. Portland, OR.
- Cavagnetto, A. R., Adesope, O. O., Gotch, C., Morrison, J. Boatman, G., Baldwin, K. & Marr, J. C.** (September, 2014). Enhancing understanding of concepts and practices of science. Poster presented at the National Math Science Partnership Conference. Washington, DC.
- Cavagnetto, A. R.** (January 2014). Evolution as a theory for teacher learning. Paper presented at the Association of Science Teacher Educators Annual International Conference. San Antonio, TX.
- Cavagnetto, A. R. & Wang, Z.** (February, 2013). Moving toward argument-based inquiry: The story of an experimental middle school in china. Paper presented at the International Conference on Immersion Approaches to Argument-Based Inquiry for Science Classrooms. Busan, Korea.
- Cavagnetto, A. R.** (March, 2012). Argument as a linchpin between learning, teaching, and

science: Conceptualizing science instruction as argument cycles. Paper presented at the National Research in Science Education Annual International Conference. Indianapolis, IN.

Cavagnetto, A. R. (January, 2012). Teacher transition toward immersive argument-based science instruction. Paper presented at the Association of Science Teacher Educators Annual International Conference. Clearwater Beach, FL.

Cavagnetto, A. R. (September, 2011). Making argument practical and accessible in science classrooms. Paper presented at Science Education at the Crossroads Conference. San Antonio, TX.

Cavagnetto, A. R., & Kurtz, K. (January, 2011). Transfer: Current understandings and the impact of a novel strategy. Paper presented at the Association of Science Teacher Educators International Conference, Minneapolis, MN.

Cavagnetto, A. R. (March, 2010). Argument based Interventions in the wake of the national science education standards. Paper presented at the National Association for Research in Science Teaching International Conference, Philadelphia, PA.

Cavagnetto, A. R. (September, 2009). Exploration into the STEM pipeline: To understand and move to expand. Paper presented at Science Education at the Crossroads Conference, Portland, OR.

Cavagnetto, A. R. (January, 2009). The role of authentic science in science education: Past models and approaches and directions for the future. Paper presented at the Association of Science Teacher Education International Conference, Hartford, CT.

Cavagnetto, A. R., & Hand, B., & Norton-Meier, L. (April, 2008). The nature of student discourse during the generation of argument. Paper presented at the National Association for Research in Science Teaching International Conference, Baltimore, MD.

Cavagnetto, A. R., & Hand, B. (August, 2007). Changes in classroom practice to enable greater dialogical interaction. Paper presentation at the European Science Education Research Association Conference, Malmo, Sweden.

Cavagnetto, A. R., Hand, B., & Norton-Meier, L., (April, 2007). Teachers' struggles with embedding argument within science inquiry and the promotion of student control and student voice in setting the question for exploration. Paper presented at the National Association for Research in Science Teaching International Conference, New Orleans, LA.

Cavagnetto, A. R., Norton-Meier, L., Hand, B. (January, 2006). Promoting science literacy, inquiry, and argumentation in elementary science classrooms: Skills necessary to move forward in teacher implementation. Paper presented at the Association of Science Teacher Education International Conference, Clearwater Beach, FL.

PRESENTATIONS (CONTRIBUTOR)

Offerdahl, E. G., Arneson, J., Baerlocher, B., Brar, G., Ledezma, N., Artiles, E., & **Cavagnetto, A. R.** (March 2022). An investigation of argumentation task framing on students' use of data in introductory biology. Paper presented at the Annual Meeting of the National Association of Research in Science Teaching. Vancouver, B.C.

Offerdahl, E. G., Arneson, J., Erickson, J., Collins, L., Davis, W. B., **Cavagnetto, A. R.** (Accepted for presentation January, 2021) Optimizing argumentation-to-learn in large-lecture introductory biology, SABER West, Virtual Conference.

Offerdahl, E.G., **Cavagnetto, A. R.**, Arneson, J.B., Woodbury, J., & Collins, L. (2019). Investigating pre-class activities to support argumentation-to-learn in large-lecture biology. Poster presented at the Society for the Advancement of Biology Education Research. July 26-28, Minneapolis, MN.

Davis, W. B., Premo, J., Collins, L., **Cavagnetto, A. R.**, & Dunn, M. (June, 2019). Leveraging Collaborative Writing and Peer Review to Promote Learning in Prosocial Classroom Environments. College of Veterinary Medicine Education Research Grant Seminar. Pullman, WA

*Coleman, Z., *Juergens, K., ¹Premo, J., Davis, W., and **Cavagnetto, A. R.** (2018). Considering Peer Ideas: Relationships between student trust, credibility, and performance during group learning. Paper presented at the 2018 Society for the Advancement of Biology Education Research's (SABER) Western Conference. Irvine, CA.

*Undergraduate research assistant in Cavagnetto Lab

¹Doctoral student –Cavagnetto Advisee.

Offerdahl, E. G., **Cavagnetto, A. R.**, Casper, A., Premo, J., *Wixom, M., Woodbury, J., LeKressner, O., *Lam, A., Davis, W. B. (2018). What kind of out-of-class activities prepare students to engage in disciplinary practices in introductory biology? Paper presented at the 2018 Society for the Advancement of Biology Education Research's (SABER) Western Conference. Irvine, CA.

*Undergraduate research assistants in Cavagnetto Lab

Premo, J., **Cavagnetto, A. R.**, and Davis, W. (2018). Social CUREs: Optimizing student

interactions to promote richer collaborative engagement in course-based undergraduate research experiences. Paper presented at the 2018 Society for the Advancement of Biology Education Research's (SABER) Western Conference. Irvine, CA.

¹Collins, L., Premo, J., **Cavagnetto, A. R.**, and Verrell, P. (2018). Understanding students' science epistemologies: Insights from a sorting task. Poster presented at the 2018 Society for the Advancement of Biology Education Research's (SABER) Western Conference. Irvine, CA.

¹Doctoral student –Cavagnetto Advisee.

Premo J. and **Cavagnetto, A. R.** (2017). Using Interdependence to Promote Student Collective Action. Poster presented at Washington State University 2017 Academic Showcase. Pullman, WA.

Premo, J., **Cavagnetto, A. R.**, & Kurtz, K. (2016). Middle School Student Application of Evolutionary Change to Behavioral Change Scenarios. Paper presented at the 2016 National Association for Research in Science Teaching Annual International Conference. Baltimore, MD.

Premo, J., Lamb, R., & **Cavagnetto, A. R.** (2016) *Cognitive Drivers of Classroom Cooperation*, poster presented at the Washington State University 2015 Academic Showcase, Pullman, WA, March, 2016.

Premo, J., Lamb, R., & **Cavagnetto, A. R.** (2016) *Conditional Classroom Cooperation: Cost and Benefit in Student Prosociality*, poster presented at the 6th Annual School of Biological Sciences Graduate Research Symposium, Pullman, WA, February, 2016.

Sundararajan, N. K., Adesope, A. A., & **Cavagnetto, A. R.** (2016). Effects of Increased Exposure to Collaborative Concept Maps on Critical Thinking Skills of Kindergarten Students. Paper presented at the 2016 American Educational Research Association Annual Conference. Washington, D.C.

Lamb, R., **Cavagnetto, A. R.**, French, B., Yin, L., Adesope, O., & Taylor, M. (2015). A potential future in education: The application of intelligent systems in teacher education. Poster presented at the International Conference of National Association for Research in Science Teaching. Chicago, IL.

Honke, G., **Cavagnetto, A. R.**, Kurtz, K., Patterson, J. D., Conaway, N., Tao, Y., & Marr, J. C. (2015). Examination of Malleable Factors of a Categorization Task that Influences Student Learning of Evolution Concepts. Paper presented at the 2015 American Educational Research Association Annual Conference. Chicago, IL.

²Doctoral student (Binghamton University Dept. of Psychology) work from IES funded project.

Adesope, O. O., **Cavagnetto, A. R.**, Hunsu, N., Anguiano, C., Lloyd, J. (2015). Differential effects of science learning with computer based concept map, refutational text, and expository text. Paper presented at the 2015 American Educational Research Association Annual Conference. Chicago, IL.

Morrison, J., **Cavagnetto, A. R.**, Adesope, O. O., Gotch, C., Boatman, G., Baldwin, K. & Marr, J. (2015). Negotiating Transition to the NGSS: Findings from a K-8 Professional Learning Project. Paper presented at the 2015 National Association for Research in Science Teaching Annual International Conference. Chicago, IL.

¹Marr, J. C., **Cavagnetto, A. R.**, Honke, G., Tao, Y., Conaway, N., Patterson, J. D., Kurtz, K. (2015). Barriers to student transfer of the evolutionary principle of variation. Poster presented at the 2015 Association of Science Teacher Educators Annual International Conference. Portland, OR.

¹Doctoral student (WSU Math/Science PhD) -Advisee.

Baldwin, K. A., Morrison, J., **Cavagnetto, A. R.**, Adesope, O. O., Gotch, C., Boatman, G., Marr, J. C. (2015). Supporting teachers' implementation of the Next Generation Science Standards: Exploring the EUCAPS partnership. Paper presented at the 2015 Association of Science Teacher Educators Annual International Conference. Portland, OR.

Baldwin, K.A., Cooper, C.M., **Cavagnetto, A. R.**, Morrison, J. & Adesope, O. (2014). Big outcrops and big ideas in Earth science K-8 professional development. Paper presented at the American Geophysical Union Annual Meeting. San Francisco, CA.

Kurtz, K.J., **Cavagnetto, A. R.**, Honke, G., Conaway, N., Patterson, J.D., Marr, J.C. Tao, Y. (2014). Optimizing the category construction task to promote learning and transfer of knowledge in classroom instruction. Paper presented at the 35th Annual Conference of the Cognitive Science Society, Quebec City, Canada.

²Wang, Z., & **Cavagnetto, A. R.** (January 2014). An investigation of Chinese middle school students' views of science. Poster presented at the Association of Science Teacher Educators Annual International Conference. San Antonio, TX.

²Doctoral student (WSU Educational Psychology) working on data from international partnership with YK Pao School, Shanghai, China.

Morrison, J., **Cavagnetto, A. R.**, Baldwin, K., Adesope, O., Gotch, C. (September, 2013). Enhancing teachers' understanding of concepts and practices in science (EUCAPS). Poster presented at the Nat. Math Science Partnership Conference. Washington, DC.

Brennan, D., **Cavagnetto, A. R.**, Gal, S., Gieskes, K., Jones, W. E., McGrann, R. (July, 2012). Go green: Using an environmentally-themed summer science program to attract and retain interest in STEM among high performing middle school students. Paper presented at the Biennial Conference on Chemical Education. State College, PA.

Promyod, N., McDermott, M., **Cavagnetto, A. R.**, & Hand, B. (January, 2012). Examining the embedded multimodal representations in student writings. Poster presented at the Association of Science Teacher Educators International Conference. Clearwater Beach, FL.

McDermott, M. A., Hand, B. M., & **Cavagnetto, A. R.** (March, 2010). Exploring the impact of embedding multiple modes of representing science information in varied classroom settings. Paper presented at the National Association for Research in Science Teaching International Conference, Philadelphia, PA.

McDermott, M. A., Hand, B., & **Cavagnetto, A. R.** (January, 2009). Encouraging embedding multiple modes of representing information in writing-to-learn activities. Paper presented at the Association of Science Teacher Education International Conference, Hartford, CT.

Yore, L., Tippet, C., Anthony, R., Choi, A., Hand, B., Norton-Meier, L., & **Cavagnetto, A. R.** (January, 2009). Research and development in science literacy and science writing. Paper presented at the Association of Science Teacher Education International Conference, Hartford, CT.

CONSULTING ACTIVITIES

2018 – 2022 Advisory panel member. NSF award number: 1812576
Moving beyond pedagogy: Developing elementary teachers' adaptive expertise in using the epistemic complexity of science. *I reviewed survey materials, research methodology, and provided feedback on data interpretation.*

2017 – 2021 Squidbooks, LLC. *I directed the development of the initial architecture for the science text for the technological platform and now primarily work on synonym development for technical words.*

- 2016 Learning Mathematics through Reasoning & Modeling Practice. Iowa Mathematics Partnership Grant; Dr. Kyong Mi Choi. *I provided feedback on the data interpretation and analysis.*
- 2015 Improving Students' Conceptual Understanding of Science and Critical Thinking Using an Argument Based Inquiry Approach. Iowa Science Partnership Grant; Dr. Brian Hand. *I provided feedback on the data interpretation and analysis.*
- 2010 – 2012 YK Pao School, Shanghai, China. Principal –Mr. Tony Jaccaci. *I led the development of Argument-Based curriculum for grade-seven science at the experimental dual-language school.*
- 2009 – 2010 Helping Students Move Between Different Ways of Representing Knowledge. Arthur Vining Davis Foundation. I served as site coordinator (conducted the professional development and data collection) for the Endicott, NY site.
- 2007 Utah State University Science Teaching Project -Consultant for Analysis Protocols; Dr. D. Todd Campbell, Utah State University-Ephraim. *I reviewed and provided feedback on analysis protocols.*

INTERNATIONAL/NATIONAL SERVICE

- 2021 - NARST Education Policy and Relations Committee member
- 2013 - Editorial Board Member, International Journal of Science and Mathematics Education.
- 2021 NARST Graduate Student Symposium Mentor
- 2019 Organized Mini-Conference at Durham University (May 22, 2019). The mini-conference focused on classroom dialogue. External scholars from Cambridge and Exeter participated along with members of Durham University's School of Education.
- 2017 NSF Panelist: Innovative Technology Experiences for Students and Teachers (ITEST).
- 2015 Chair of Conference Organizing Committee, 2nd International Conference on Argument-Based Inquiry, Spokane, WA.
- 2012-2015 Professional Development Committee, Association for Science Teacher Education.

- 2014 NSF Panelist: Research on Education and Learning (REAL).
- 2014 Co-Organizer Immersion Approaches to Argument Research Collaborative Retreat, Iowa City, IA.
- 2013 Conference Organizing Committee, 1st International Conference on Argument-Based Inquiry, Busan, Korea.

Ad hoc Journal Reviewer

Journal of Research in Science Teaching, Science Education, School Science and Mathematics, Review of Educational Research, Research in Science Education, Science & Education, Journal of Applied Research in Education, International Journal of Mathematics and Science Education, Asia-Pacific Education Review

Conference Reviewer

- 2014, 2020 National Association for Research in Science Teaching Annual Conference
- 2019 Society for the Advancement of Biology Education Research
- 2011, 2012 American Educational Research Association Annual Conference
- 2010-2015 Association of Science Teacher Educators International Conference

STATE SERVICE

- 2016 NGSS Advisory Group member for Washington State. This group met for a few monthly meetings to discuss ways to improve the dissemination and implementation of the NGSS in the state of Washington.
- 2013 Science Work Group Committee Member to advise the Washington State Professional Educator Standards Board (PESB). The work group developed competencies in science for Elementary and Early Childhood Education majors in the state of Washington.

UNIVERSITY SERVICE

- 2013 - 2018 Faculty Senate Library Committee
- 2018 New Faculty Seed Grant Reviewer
- 2016, 2017 Faculty Status Committee Nomination subcommittee
- 2016, 2017 Showcase for Undergraduate Research and Creative Activities (SURCA) Judge

COLLEGE OF EDUCATION SERVICE

- 2021 – Math/Science PhD Program Coordinator
- 2020 – COE Graduate Studies Committee (Chair)
- 2020 – Review Elementary Education students' science coursework petitions
- 2015 – Oversee Elementary Science Education Adjunct Instruction
- 2019 –2021 Math/Science PhD Associate Program Coordinator
- 2017 - 2020 Master in Teaching Program Committee (member)
- 2019 – 2020 Search Committee (Chair), Assistant Professor of Science Education
- 2019 – 2020 COE Graduate Studies Committee (member)
- 2018 – 2020 Petition reviewer for science equivalents elementary education program (1-2 petitions reviewed per week).
- 2017 – 2018 Math/Science PhD Associate Program Coordinator
- 2017 – 2018 Mentor Committee (Chair), Devasmita Chakraverty
- 2017 Elementary Science Competency Committee
- 2016 – 2018 Elementary Education Committee
- 2016 Khon Kaen University International Seminar -Graduate Research Review
- 2015 Science Education Spokane Search Committee
- 2015 – 2018 Mentor Committee, Christopher Connolly
- 2013, 16–18 College of Education Student Interviews
- 2013 – 2018 Mentor Committee (Chair), Richard Lamb
- 2013 – 2018 Pre-service secondary science teaching program

- 2013 Math Education Search Committee (Chair)
- 2012 Science Education Search Committee
- 2012 Teacher Education Committee
- 2012 Middle Level Science Equivalencies Committee

COLLEGE OF ARTS AND SCIENCES SERVICE

- 2019 – SBS Curriculum Committee
**I did not serve on the committee in Fall 2020 due to health issues. Service resumed Spring 2021.*
- 2019 – SBS Career Track Mentoring Committee
- 2017 SBS Broader Impacts Committee. *I worked to develop a unified broader impacts statement template that can be used by SBS faculty applying for NSF funding. This consisted of holding focus group interviews with faculty and consolidating ideas from those interviews and alignment with community resources.*
- 2016 Secondary Biology Education Program Revision. *I led the undergraduate biology option revision.*
- 2015 Faculty Advisor for Evaluation of BIOL 106 Revision. *I oversaw evaluation analysis by doctoral student J. Premo.*

COMMUNITY SERVICE

- 2017 – 2019 Palouse Youth Hockey Association – Assistant Coach
- 2017 Pullman Parks and Recreation – Little League Coach
- 2016 – 2018 Franklin Elementary School Science Fair Judge
- 2016 Franklin Elementary School –Kindergarten Reading Station Support
- 2013, 2014 WSU Child Development Center Guest Presentation -Engaged 4 & 5 year old students in decomposition exploration

2013 Sunnyside Elementary School –Grade 5, Pullman WA -Guest investor/judge of skate-park designs

PROFESSIONAL MEMBERSHIPS

National Association for Research in Science Teaching
 European Science Education Research Association
 American Educational Research Association
 American Association for the Advancement of Science
 National Science Teachers Association
 Association of Science Teacher Educators
 Washington Science Teachers Association

PROFESSIONAL LEARNING

2021 AERA-ICPSR-PEERS Data Hub Training: Modern Meta-Analysis Research (Feb 10, 2021)
 2020 Workday Training, Online through WSU
 2019 Bias during hiring training. Dr. Jaime Nolan (WSU)
 2018 Documenting your teaching and Teaching Impact. Dr. Steve Hines (WSU)
 2018 Data Skills for Education Researchers. Erin Becker, Data Carpentry Education
 2018 R for Data Analysis, Kameryn Denaro, University of California Irvine (Workshop at SABER West regional conference)

MENTORING

Doctoral Committees

Patrick Ochieng (T&L) – Temporary Advisor	
Opeyemi Nofiu (SBS) - Chair	
Alec Jones (T&L) – Temporary Advisor	
Elizabeth Grace (T&L) – Committee Member	
Rachel Halsey (T&L) – Committee Member	
Melissa Pearcy (T&L) – Temporary Advisor	Fall 2020 – Spr 2022
Lindsay Lightner (T&L) –Chair	Completed 2022
Larry Collins (SBS) –Chair	Completed 2021
Joshua Premo (SBS) –Chair	Completed 2019
Jack Kernion (Univ. of Pittsburgh) – Committee Member	Completed 2019
Nathaniel Hunsu (Ed Psych) – Committee Member	Completed 2017
Zhe Wang (Ed Psych) – Committee Member	Completed 2016

Doreen Keller – Committee Member (Education)	Completed 2013
Doctoral Chair - Sandra Mattison (Education)	Completed 2011
Committee Member - Clara Davie (Biology/Education PhD)	Completed 2011

Master Committees

*Narayankripa Sundararajan – Committee Member	Completed 2015
*Charles Allen Master’s Thesis award recipient	

Masters in Teaching -Capstone Project Mentor

Lindsay Hilldorfer	Completed 2017
Amanda (Paige) Lathem	Completed 2017
Troy Reardon	Completed 2015
Collin Roholt	Completed 2014
Luke Conley	Completed 2014
George Reddick	Completed 2013
Johanna Brown	Completed 2013

Honors College Students

Lauren Duffy	
Olivia Prestis	Completed Fa20

Post-Baccalaureate Research Assistant

Dana Roach	2020 –
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Undergraduate Research Assistants

Lauren Duffy	2020 – 2022
Anna Ferroggiaro	2020 – 20XX
Brandon Call	2020 – 2021
Cicely Wu	2020 – 2021
Blake Cheshier	2020
Ayden Hackett	2020
Roseanne Mier	2018 – 2020
Madeline Smith	2018 – 2019
Sarah Beebe	2018 – 2019
Jamierin Walters	2018
Zachary Coleman	2016, 2017
McKayla Wixom	2017
Alicia Lam	2017
Kate Juergens	2017
Terrell Ware	2016, 2017
Kiera McMenimen	2014 – 2017
Samantha Pederson	2014

Hanna Schweiter	2014
Yelena Novik	2013, 2014
Nemer Tello	2013, 2014

TEACHER PROFESSIONAL DEVELOPMENT

- 2020 *Argument Structure for Large Lecture*. Presentation and discussion for the Argument-Based Learning Group at Iowa State University. May 26, 2020. I virtually led an hour-long session on structuring argument activities in large lecture science settings.
- 2020 *Argument* – I served as a session presenter for PD associated with NSF award Moving beyond pedagogy: Developing elementary teachers' adaptive expertise in using the epistemic complexity of science (Award Number: 1812576). Approximately 120 teachers from Alabama and Iowa participated in the virtual session.
- 2016 *Implementing Argumentation to Learn*. Pella, IA School District. I virtually attended a professional development day in Pella, IA to work with teachers on implementation of argumentation-to-learn at elementary school levels.
- 2013 - 2015 *Enhancing Understanding of Concepts and Practices of Science (EUCAPS)*. The purpose of the program was to help teachers create environments that immerse students in doing science (including the thinking and rhetorical practices of science) in order to learn about science and science concepts. Clarkston, WA (80+hours of PD per year).
- 2012 *Meshing Authentic Science with Student Learning in Science*. The workshop for 4th and 5th grade teachers explored the epistemic nature of science and contemporary views of learning over six months. Winsor, NY
- 2010 – 2011 *Integrating Language Practices into Elementary Science Instruction* (In-service Teachers). The workshop explored the use of language as a tool for learning science concepts in the upper elementary grade levels (4th and 5th). Binghamton, NY
- 2009 – 2010 *Helping Students Move Across Different Modes of Representation in Science*. The workshop focused on helping teachers integrate the use of graphs, pictures, equations, and other non-text forms of representation within their science classrooms. I coordinated the Endicott, NY site which was part of a grant from the Arthur Vining Davis Foundation.

- 2007 *Fostering Increased Dialogical Interaction and Teacher as Negotiator in the Elementary Classroom.* The workshop focused on obstacles to transitioning to greater dialogue in the science classroom. Ames, IA.
- 2006 *Fostering Scientific Argument.* The workshop helped elementary school teachers integrate argument as a tool for learning science content. Boone, IA.

TEACHING

(* courses that I developed or revised significantly)

*Research Seminar in Mathematics & Science Education (Ed_MthSci 598) **

The course is designed to support students in their development as researchers and skills associated with academic discussion.

Frameworks for Research in Mathematics and Science Education (TCH LRN 531)

The purpose of this course is to explore commonly used theoretical frameworks in educational research with a particular emphasis on those used in science and mathematics education research.

*Research on Teaching Mathematics and Science (TCH LRN 584)**

This course is designed to provide a look at the playing field in Math and Science Education research. Throughout the course students develop an understanding of the research literature, in particular, central issues related to mathematics and science teaching.

*Methods in Teaching Elementary School Science (TCH LRN 371 & 572, +BU-EDUC 507)**

This course explores and advances students' understanding of teaching science at the elementary school level. Students develop and implement innovative and engaging science demos/labs/lessons using the Science Writing Heuristic approach. Students critically analyze their practice and provide feedback for peers related to their practice. Emphasis is placed on alignment of learning, instruction, and curriculum.

*Methods in Teaching Science (BIOL/TCH LRN 430, BU-SEC 594D)**

This course explores and advances students' understanding of teaching science. Students develop and implement innovative and engaging science demos/labs/lessons/ and units using the Science Writing Heuristic as a pedagogical approach. Students critically analyze their practice and provide feedback for peers related to their practice. Emphasis is placed on alignment of Learning, Nature of Science, Pedagogy, Curriculum, and Assessment.

*Research in Science Education (BU-EDUC 597)**

This independent study opportunity was offered to eight undergraduate students in the Spring 2012. The purpose was to organize a research team to analyze data collected from a fall 2011 study of seventh grade students in Shanghai, China. Students proposed and subsequently debated various mixed methodologies to refine the analysis methodology. They then conducted the analysis and summarized the findings in presentations.

*Practical Experience in Evaluating and Conducting Educational Research (BU-EDUC 680V)**

EDUC 680V was an opportunity for students to gain experience in developing, conducting, and evaluating research in educational settings. Students explored fundamental questions such as how do I develop a meaningful research question? and how do I determine which methodology is most appropriate? Additionally, students learned how to develop a manuscript for publication or conference proposal.

*Foundations of Secondary Education (BU-SEC 500)**

SEC 500 explored and advanced student understanding of the foundational aspects of secondary education. Throughout the course, students studied philosophy and social issues related to education as well as learning theory and instructional design. Most of the students in this course have been graduate students, but there have been undergraduates enrolled in this course as well.

*Applied Research Techniques (BU-EDUC 541)**

An introduction to educational research, this course was designed to improve in-service and pre-service teachers' abilities to analyze and evaluate educational research. As such, the course focused on quantitative, qualitative, and mixed methodologies. Students read and evaluated representative cases and proposed research initiatives.

Pre-service Practicum in Teaching –Secondary (BU-SEC 590/591)

SEC 590/591 is the teaching internship at grades 7-9 and 10-12. My role was to conduct four classroom observations per student and hold follow up with students individually to discuss their instruction. As such, I had the opportunity to work closely with the students throughout the semester as they conceptualize and strategically plan their instruction.

Pre-service Practicum in Teaching –Elementary (BU-ELED 590/591)

ELED 590/591 is the elementary teaching internship for elementary education majors. This course also included a seminar held each week to discuss conceptualization and planning as well as issues that developed during student teaching.

Societal and Educational Applications of Biology (UIowa)

The goal of this course was to emphasize a Science, Technology, and Society approach to science instruction. This approach utilizes student driven inquiry and emphasized that students take action in the community based on the findings from their explorations. This class was an undergraduate elective at the University of Iowa.

+BU denotes courses taught at Binghamton University