

**ERIC BREWE**  
**Associate Professor of Physics and Science Education**  
**Drexel University**

Link to Current CV: <https://goo.gl/Wpw7Xi>  
Academic Website: [ericbrewe.com](http://ericbrewe.com)

**EDUCATION**

Ph.D.	Arizona State University	Curriculum and Instruction, Spec. Physics Education Research	December, 2002
M.S.	Arizona State University	Physics,	December, 1999
B.A.	DePauw University	Physics,	May, 1996

**FULL-TIME ACADEMIC EXPERIENCE**

Drexel University	Associate Prof.	Physics & Science Education	01/17-present
Florida International Univ.	Assoc. Director Research	STEM Transformation Institute	01/14-12/17
Florida International Univ.	Associate Prof.	Science Education	08/13-12/17
Florida International Univ.	Assistant Prof.	Science Education	08/07-08/13
Hawaii Pacific University	Assistant Prof.	Physics	08/02-08/07

**PART-TIME ACADEMIC EXPERIENCE**

Chandler Gilbert C.C.	Adjunct	Physics	01/2000-05/02
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**PUBLICATIONS IN DISCIPLINE**

**Articles:**

1. Biswas, S., Benabentos, R., Brewe, E., Potvin, G., Edwards, J., Kravec, M., Kramer, L.H. (2022 - Accepted 1 March 22) Institutionalizing evidence-based STEM reform through faculty professional development and support structures. *International Journal of STEM Education*
2. *Commeford, K., Brewe, E., Traxler, A.L.* (2022). Characterizing active learning environments in physics using latent profile analysis. *Physical Review Physics Education Research* 18(1), 010113, [10 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.18.010113>
3. *Commeford, K., Brewe, E., Traxler, A.L.* (2021). Characterizing active learning environments in physics using network analysis and classroom observation protocol for undergraduate observations. *Physical Review Physics Education Research* 17(2), 020136, [20 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.17.020136>
4. **Brewe, E.\***, Traxler, A.L.\*, Scanlin, S. (2021). Transitioning to remote instruction: Strong ties and anxiety *Physical Review Physics Education Research* 17(2), 023103, [6 pages],

doi: <https://doi.org/10.1103/PhysRevPhysEducRes.17.023103>

5. Traxler, A.L., Suda, T., **Brewer, E.**, & *Commeford, K.* (2020). Network positions in active learning environments in physics. *Physical Review Physics Education Research* 16(2), 020129, [20 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.16.020129>
6. Hazari, Z., Chari, D., Potvin, G., and **Brewer, E.** (2020). The Changing Nature of Physics Identity: Examining the relationship between interest, performance/competence, recognition, and sense of belonging for female undergraduates. *Journal of Research in Science Teaching* [25 pages], doi: <https://doi.org/10.1002/tea.21644>
7. McPadden, D., **Brewer, E.**, Monsalve, C., and Sawtelle, V. (2020). Productive faculty resources activated by curricular materials: An example of epistemological beliefs in University Modeling Instruction *Physical Review - Physics Education Research* 16(2), 020158, [16 pages], <https://doi.org/10.1103/PhysRevPhysEducRes.16.020158>
8. *Bartley, J.E.*, Riedel, M., Salo, T., Boeving, E.R., Bottenhorn, K.L., Bravo, E.I., Odean, R., Nazareth, A., Laird, R.W., Sutherland, M.T., Pruden, S.M., **Brewer, E.**, and Laird, A.R. (2019) Brain activity links performance in science reasoning with conceptual approach. *npj Science of Learning*, 4(20), [8 pages], doi: <https://doi.org/10.1038/s41539-019-0059-8>
9. *Williams, E.*, Zwolak, J., Dou, R., and **Brewer, E.** (2019). Engagement, integration, involvement: Supporting academic performance and developing a classroom social network. *Physical Review - Physics Education Research* 15(2), 020150, [15 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.15.020150>
10. Rodriguez, A.L., Stephans, D.P., **Brewer, E.**, Ramarao, I., Madhivanan, P., (2019) A network analysis of domestic violence beliefs among young adults in India. *Journal of Interpersonal Violence*, [26 pages] <https://doi.org/10.1177/0886260519889923>
11. Gonzalez, A.A., Bottenhorn, K.L., Bartley, J.E., Hayes, T., Riedel, M., Salo, T., Bravo, E.I., Odean, R., Nazareth, A., Laird, R.W., Sutherland, M.T., **Brewer, E.**, Pruden, S.M., and Laird, A.R., (2019) Sex differences in brain correlates of STEM anxiety. *npj Science of Learning* 4(18), [10 pages], doi: <https://doi.org/10.1038/s41539-019-0058-9>
12. Aycock, L.M., Hazari, Z., **Brewer, E.**, Clancy, K.B.H., Hodapp, T., and Goertzen, R.M. (2019) Sexual harassment reported by undergraduate female physicists. *Physical Review - Physics Education Research* 15(1) 010121 [13 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.15.010121>
13. **Brewer, E.** (2018). The roles of engagement: Network analysis for Physics Education Research. *Getting Started in Physics Education Research* (4)2. [17 pages], <https://www.compadre.org/Repository/document/ServeFile.cfm?ID=14725&DocID=4886>
14. McPadden, D., Dowd, J., & **Brewer, E.** (2018). Power Boxes: New representation for analyzing DC circuits. *The Physics Teacher* 56(6), 362-366, <https://doi.org/10.1119/1.5051147>
15. *Bartley, J. E.*, Boeving, E.R., Riedel, M.C., Bottenhorn, K.L., Salo, T., Eickhoff, S.B., **Brewer, E.**, Sutherland, M.T., Laird, A.R. (2018). Meta-analytic evidence for a core problem solving

- network across multiple representational domains. *Neuroscience & Biobehavioral Reviews*. 92 [19 pages], doi: [doi.org/10.1016/j.neubiorev.2018.06.009](https://doi.org/10.1016/j.neubiorev.2018.06.009)
16. Dou, R., **Brewer, E.**, Potvin, G., Zwolak, J.P., & Hazari, Z. (2018). Understanding the Development of Interest and Self-Efficacy in Reformed Undergraduate Physics Courses. *International Journal of Science Education* [19 pages], doi: [10.1080/09500693.2018.1488088](https://doi.org/10.1080/09500693.2018.1488088)
  17. **Brewer, E.**,\* Sawtelle, V.\* (2018). Modeling Instruction for University Physics: Examining the Theory in Practice. *European Journal of Physics, Special Issue Modelling in Physics Instruction*. 39(5) 054001 [26 pages] <https://doi.org/10.1088/1361-6404/aac236> \*Co-first Authors.
  18. **Brewer, E.\***, Bartley, J.E.\* , Riedel, M.C., Sawtelle, V., Salo, T., Boeving, E.R., Bravo, E.I., Odean, R., Nazareth, A., Bottenhorn, K.L., Laird, R.W., Sutherland, M.T., Pruden, S.T., and Laird, A.R., (2018). Toward a neurobiological basis for understanding learning in Modeling Instruction physics courses. *Frontiers in ICT, Research Topic: Active Learning: Theoretical Perspectives, Empirical Studies and Design Profiles*. 5, [10 pages], doi: <https://doi.org/10.3389/fict.2018.00010> \*Co-first Authors.
  19. Zwolak, J., Zwolak, M., & **Brewer, E.** (2018). Educational commitment and social networking: The power of informal networks.\* *Physical Review - Physics Education Research*. 14(1) 010131 [12 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.14.010131> \*Editors Choice
  20. **Brewer, E.**, Dou, R., Shand, R. (2018) Costs of Success: Financial Implications of Introductory Science Course Reform for Students, Administrators and Taxpayers, *Physical Review - Physics Education Research* 14(1), 010109 [8 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.14.010109>.
  21. *McPadden, D.*, & **Brewer, E.** (2017). Impact of the second semester University Modeling Instruction course on students' representation choices. *Physical Review - Physics Education Research* 13(2), 020129 [15 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.13.020129>
  22. Zwolak, J.P., Dou, R., *Williams, E.A.*, **Brewer, E.** (2017). Students' network integration as a predictor of persistence in introductory physics courses. *Physical Review - Physics Education Research* 13(1), 010113 [14 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.13.010113>
  23. Hazari, Z., Goertzen, R.M., **Brewer, E.**, & Hodapp, T. (2017) The Importance of High School Physics Teachers for Female Students' Physics Identity and Persistence, *The Physics Teacher*, 55(2), 96-99, <http://dx.doi.org/10.1119/1.4974122>
  24. **Brewer, E.**, Bruun, J., & Bearden, I. (2016) Using Module Analysis for Multiple Choice Responses: A New Method Applied to Force Concept Inventory Data, *Physical Review – Physics Education Research* 12(2), 020131 [19 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.12.020131>.

25. Dou, R., **Brewer, E.**, Zwolak, J., Potvin, G., Williams, E.A., and Kramer, L.H. (2016). Beyond Performance Metrics: Examining a drop in students' physics self-efficacy through a social networks lens, *Physical Review – Physics Education Research* 12(2), 020124 [14 pages], doi: <https://doi.org/10.1103/PhysRevPhysEducRes.12.020124>.
26. Traxler, A., **Brewer, E.** (2015). Equity investigation of attitudinal shifts in introductory physics, *Physical Review Special Topics – Physics Education Research* 11(2), 020132 [7 pages], doi: <https://doi.org/10.1103/PhysRevSTPER.11.020132>.
27. Rodriguez, I., Goertzen, R.M., **Brewer, E.**, & Kramer, L.H. (2015). Developing a physics expert identity in a biophysics research group, *Physical Review Special Topics – Physics Education Research* 11(1), 010116 [15 pages] doi: <https://doi.org/10.1103/PhysRevSTPER.11.010116>.
28. **Brewer, E.**, Traxler, A.L., de la Garza, J.E., & Kramer, L.H., (2013). Extending positive C-LASS results across multiple instructors and multiple classes of Modeling Instruction, *Physical Review Special Topics – Physics Education Research* 9(2), 020116 [10 pages] doi: <https://doi.org/10.1103/PhysRevSTPER.9.020116>.
29. Bruun, J., & **Brewer, E.** (2013). Talking and learning physics: Predicting future grades from network measures and FCI pre-test scores, *Physical Review Special Topics – Physics Education Research* 9(2), 020109, [13 pages], doi: <https://doi.org/10.1103/PhysRevSTPER.9.020109>.
30. **Brewer, E.**, Pelaez, N.J., Cooke, T.J., (2013). Editorial: From Vision to Change: Educational Initiatives and Research at the Intersection of Physics and Biology, *CBE – Life Science Education*, 12(2), 117-119.
31. Manthey, S., **Brewer, E.** (2013). Towards University Modeling Instruction – Biology: Adapting curricular frameworks from physics to biology, *CBE-Life Sciences Education*, 12(2), 206-214 doi: <https://doi.org/10.1187/cbe.12-08-0136>
32. Sawtelle, V., **Brewer, E.** Goertzen, R.M. & Kramer, L.H. (2012). Identifying Events that Impact Self-Efficacy in Physics Learning, *Physical Review Special Topics - Physics Education Research*, 8, 020111, [18 pages], doi: <https://doi.org/10.1103/PhysRevSTPER.8.020111>.
33. Goertzen, R.M., **Brewer, E.**, Kramer, L.H. (2012) Expanded markers of success in introductory university physics, *International Journal of Science Education*, p. 1-27, [doi:10.1080/09500693.2012.718099](https://doi.org/10.1080/09500693.2012.718099)
34. Sawtelle, V., **Brewer, E.** & Kramer, L.H. (2012) Exploring the Relationship Between Self-Efficacy and Retention of Students, both Men and Women, in Introductory Physics, *Journal of Research in Science Teaching* DOI: <https://doi.org/10.1002/tea.21050>
35. Rodriguez, I., **Brewer, E.**, Sawtelle, V., & Kramer, L.H. (2012). Impact of Equity Models and Statistical Measures on Interpretations of Education Reform, *Physical Review Special Topics - Physics Education Research*, 8, 020103, [7 pages], doi: <https://doi.org/10.1103/PhysRevSTPER.8.020103>.
36. **Brewer, E.**, Kramer, L.H., and Sawtelle, V., (2012). Investigating Student Communities with Network Analysis of Interactions in a Physics Learning Center, *Physical Review Special Topics*

- *Physics Education Research*, **8**, 010108, [8 pages],  
<https://doi.org/10.1103/PhysRevSTPER.8.010101>.
37. Goertzen, R., **Brewer, E.**, Kramer, L., Wells, L., & Jones, D. (2011). Moving toward change: Institutionalizing reform through implementation of the Learning Assistant model and Open Source Tutorials. *Physical Review Special Topics - Physics Education Research*, *7*, [9 pages]. Doi: <https://doi.org/10.1103/PhysRevSTPER.7.020105>
  38. **Brewer, E.** (2011). Energy as a substance-like quantity that flows: Theoretical considerations and pedagogical consequences, *Physical Review Special Topics - Physics Education Research*, *7*, 020106, [14 pages]. <https://doi.org/10.1103/PhysRevSTPER.7.020106>
  39. Kramer, L.H., O'Brien, G.E., **Brewer, E.** (2010). The physics of change: Integrating science students into learning communities, *The Advocate*, *27*(6), 5-8.
  40. Weeks, O.I., E. Villamor, E. Tracey, M., Stoddard, P., Shapiro, S., Makemson, J., Garcia, R., Gavassa, S., Philippi, T., Pitzer, T., Dewsbury, B., Narasimhan, G., McGoron, A., Bhajjee, S., Alberte, J., Graves, P., Gomez, R., Koptur, S., Galvez, M., Heffernan, J., Kos, L., Lowenstein, M., Rosenblatt, A., Baker, J., Quirke, M., **Brewer, E.**, Tashakkori, A., (2010). QBIC, an interdisciplinary and quantitative biological sciences curriculum: concept to implementation. *Journal of Science Education*, *12*(1), 11-14.
  41. **Brewer, E.**, Sawtelle, V., Kramer, L.H., O'Brien, G.E., Rodriguez, I., & Pamela, P. (2010). Toward equity through participation in Modeling Instruction in introductory university physics, *Physical Review Special Topics-Physics Education Research*, **6**, 010106, [12 pages], <https://doi.org/10.1103/PhysRevSTPER.6.010106>.
  42. **Brewer, E.**, Kramer, L., & O'Brien, G., (2009). Modeling Instruction: Positive attitudinal shifts in introductory physics measured with CLASS, *Physics Review Special Topics-Physics Education Research*, *5*, 013102, [5 pages], <https://doi.org/10.1103/PhysRevSTPER.5.013102>.
  43. Sawtelle, V., **Brewer, E.**, & Kramer, L., (2009). A validation study of the Colorado Learning About Science Survey at a Hispanic-Serving Institution," *Physics Review Special Topics-Physics Education Research*, *5*, 023101, [5 pages], <https://doi.org/10.1103/PhysRevSTPER.5.023101>.
  44. **Brewer, E.** (2008). Modeling theory applied: Models in the university physics classroom, *American Journal of Physics* **76**(12), 1155-1160, <http://dx.doi.org/10.1119/1.2983148>.
  45. Hsu, L., **Brewer, E.**, Foster, T. M., & Harper, K. A. (2004) Problem Solving Resource Letter, *American Journal of Physics* **72**(9), 1147-1156, <http://dx.doi.org/10.1119/1.1763175>.
  46. **Brewer, E.**, (2004). Panel Discussion, Course Wrap-up, In Redish, E. F. & Vicentini, M. (Eds.), *Proceedings of the Enrico Fermi Summer School, Course CLVI*. Bologna; Italian Physical Society.

1. *Franklin, M., **Brewe, E.**, Ponnock, A.R., & Goertzen, R.M., (2021 - accepted) Examining reasons undergraduate women join physics, 2021 Physics Education Research Conference Proceedings [Virtual Conference, August 4-5, 2021] edited by Bennett, M.B., Frank, B.W., and Vieyra, R.E.*
2. *Commeford, K., **Brewe, E.** and Traxler, A. (2019) Characterizing active learning environments in physics: network analysis of Peer Instruction classrooms using ERGMs, 2019 Physics Education Research Conference Proceedings [Provo, UT, July 24-25, 2019] edited by Cao, Y., Wolf, S., and Bennett, M.B., doi: [10.1119/perc.2019.pr.Commeford](https://doi.org/10.1119/perc.2019.pr.Commeford)*
3. *Williams, E. A., Zwolak, J.P., and **Brewe, E.** (2017) Physics major engagement and persistence: a phenomenography interview study, 2017 Physics Education Research Conference Proceedings [Cincinnati, OH, July 26-27, 2017], edited by Ding, L., Traxler, A., and Cao, Y., doi: [10.1119/perc.2017.pr.104](https://doi.org/10.1119/perc.2017.pr.104).*
4. *Zwolak, J.P., Dou, R., and **Brewe, E.** (2017) Student perceptions of the value of out-of-class interactions: Attitudes vs. Practice, 2017 Physics Education Research Conference Proceedings [Cincinnati, OH, July 26-27, 2017], edited by Ding, L., Traxler, A., and Cao, Y., doi:[10.1119/perc.2017.pr.115](https://doi.org/10.1119/perc.2017.pr.115).*
5. *Zwolak, J.P. and **Brewe, E.** (2015). The impact of social integration on student persistence in introductory Modeling Instruction courses, 2015 PERC Proceedings, College Park, MD, July 29-30, 2015, edited by A. D. Churukian, D. L. Jones, and Lin Ding.*
6. *Williams, E., **Brewe, E.**, Zwolak, J.P., and Dou, R. (2015). Understanding Centrality: Investigating Student Outcomes within a Classroom Social Network, 2015 PERC Proceedings, College Park, MD, July 29-30, 2015, edited by A. D. Churukian, D. L. Jones, and Lin Ding.*
7. *McPadden, D., and **Brewe, E.** (2015). Network Analysis of Students' Representation Use in Problem Solving, 2015 PERC Proceedings, College Park, MD, July 29-30, 2015, edited by A. D. Churukian, D. L. Jones, and Lin Ding.*
8. *Kornreich-Leshem, H., **Brewe, E.**, Hazari, Z., Milani, M., Potvin, G. and Kramer, L. H. (2015) Evaluation of a Summer Bridge Program Using Multivariate Matching, 2015 PERC Proceedings, College Park, MD, July 29-30, 2015, edited by A. D. Churukian, D. L. Jones, and Lin Ding.*
9. *Cochran, G.L., Brookes, D.T., Kramer, L.H., & **Brewe, E.** (2013). A framework for assessing learning Assistants reflective writing assignments. *Proceedings of the 2012 Physics Education Research Conference*, AIP Press. Melville, NY. p. 15-18.*
10. *Rodriguez, I., Goertzen, R.M., **Brewe, E.**, & Kramer, L.H. (2013). Cookies as agents for community membership. *Proceedings of the 2012 Physics Education Research Conference*, AIP Press. Melville, NY. p. 342-345.*

11. *Samuels, N., Brew, E., & Kramer, L.H., (2013). Instructional changes based on cogenerative physics reform. Proceedings of the 2012 Physics Education Research Conference, AIP Press. Melville, NY. p. 38-41.*
12. *Mahadeo, J.V., Manthey, S.R., & Brew, E. (2013). Regression analysis exploring teacher impact on student FCI post scores. Proceedings of the 2012 Physics Education Research Conference, AIP Press. Melville, NY. p. 278-281.*
13. *Sawtelle, V., Brew, E., Goertzen, R.M., Kramer, L., (2012). Creating Opportunities to Influence Self-Efficacy through Modeling Instruction, Proceedings of the 2011 Physics Education Research Conference, AIP Press. Melville, NY. 339-342.*
14. *Rodriguez, I., Goertzen, R. M., Brew, E., Goertzen, R.M., Kramer, L., (2012). Communicating Scientific Ideas: One Element of Physics Expertise, Proceedings of the 2011 Physics Education Research Conference, AIP Press. Melville, NY., 319-322*
15. *Durden, J., Brew, E., Kramer, L.H., (2012). "Implicit action": Understanding discourse management in Modeling Instruction, Proceedings of the 2011 Physics Education Research Conference, AIP Press, Melville, NY., 187-190.*
16. *Lee. M., Dancy, M., Henderson, C., and Brew, E. (2012). Successes and constraints in the enactment of a reform, Proceedings of the 2011 Physics Education Research Conference, AIP Press. Melville, NY., 239-242.*
17. *Sawtelle, V., Brew, E., & Kramer, L.H., (2010). Positive Impacts of Modeling Instruction on Self Efficacy, Physics Education Research Conference 2010, American Institute of Physics Conference Proceedings v1289 p289-292.*
18. *Rodriguez, I., Brew, E., & Kramer, L.H. (2010) Constructing a model of physics expertise, Physics Education Research Conference Proceedings 2010, American Institute of Physics Conference v1289, 277-280.*
19. *Brew, E., Kramer, L.H., & O'Brien, G.E. (2010). Changing participation through formation of student learning communities, Physics Education Research Conference 2010, American Institute of Physics v1289, p 85-88.*
20. *Brew, E. Kramer, L., & O'Brien, G., (2009). Investigating Student Communities with Network Analysis of Interactions in a Physics Learning Center, In Sabella, M., Henderson, C., & Singh, C. (Eds.) American Institute of Physics Conference Proceedings, Physics Education Research Conference. (106-109). New York: American Institute of Physics Press.*
21. *Sawtelle, V., Brew, E., & Kramer, L. (2009). An exploratory qualitative study of the proximal goal setting of two introductory Modeling Instruction physics students. In Sabella, M., Henderson, C., & Singh, C. (Eds.) American Institute of Physics Conference Proceedings, Physics Education Research Conference. (261-264). New York: American Institute of Physics Press.*

22. **Brewer, E.** Kramer, L., & O'Brien, G., (2008) CLASS shifts in Modeling Instruction. In Henderson, C., Sabella, M., & Hsu, L., (Eds.) *American Institute of Physics Conference Proceedings, Physics Education Research Conference*. v1064, (79-82) New York: American Institute of Physics Press.
23. Wells, L., Valenzuela, R., **Brewer, E.**, Kramer, L., O'Brien, G., & Zamolla, E., (2008). Impacts of the FIU PhysTEC reform of introductory physics labs, In Henderson, C., Sabella, M., & Hsu, L., (Eds.) *American Institute of Physics Conference Proceedings, Physics Education Research Conference*. v1064, (227-230) New York: American Institute of Physics Press.
24. Dancy, M., **Brewer, E.**, & Henderson, C., (2007). Modeling success: Building community for reform, In Hsu, L, Henderson, C. & McCollough, L. (Eds.) *American Institute of Physics Conference Proceedings Physics Education Research Conference V.951*, (77-80). New York: American Institute of Physics Press

## EDITED BOOKS & JOURNALS

Sandifer, C., & **Brewer, E.**, Editors, *Recruiting and Educating Future Physics Teachers: Case Studies and Effective Practices*. (American Physical Society, College Park, MD, 2015)  
<https://www.phystec.org/webdocs/EffectivePracticesBook.cfm>.

**Brewer, E.** Sawtelle, V., Editors, *Focused Collection, Physical Review Special Topics – Physics Education Research*, “Gender in Physics” (2016)  
<https://journals.aps.org/prper/edannounce/10.1103/PhysRevPhysEducRes.12.020001>.

**Brewer, E.**, Cooke, T.J., & Pelaez, N. Editors, *Special Issue, CBE- Life Science Education*, “Integrating Physics and Biology Education” (2013) <http://www.lifescied.org/content/12/2.toc>

## OTHER PUBLICATIONS

### PRESENTED PAPERS, AND LECTURES

#### Plenary Talks - National Meetings

**Brewer, E.** (2011). Teaching and Learning Physics, Plenary Talk, Foundations and Frontiers of Physics Education Research, Bar Harbor, ME.

**Brewer, E.** (2011). The Physics Teacher's Dilemma, Plenary Talk, Physics Teacher Education Coalition National Meeting, Austin, TX.

#### Invited Talks/Posters - National Meetings

**Brewer, E.**, Pando, J., and Franklin, S., (2020) A toolkit for physics department advocacy (and survival) and its connection to EP3. American Physical Society April Meeting. Washington D.C (took place remotely due to COVID): American Physical Society.



- Brewe, E.,** (2018). Roles of Engagement: Network analysis in PER. Colloquium Cornell University, Ithaca, NY.
- Brewe, E.,** (2018). Roles of Engagement: Network analysis in PER. Invited Talk, American Association of Physics Teachers National Conference Summer, Washington, DC.
- Brewe, E.,** (2018). Roles of Engagement: Network analysis in PER. Invited seminar, RISE Center, University of Maine, Bangor, ME.
- Brewe, E.,** (2017). Models and Modeling in Introductory Physics, Invited seminar, Psychology and Education group at Temple University, Philadelphia, PA.
- Brewe, E.,** (2016). Mining FCI data to more effectively diagnose student conceptions, Invited Talk American Association of Physics Teachers National Conference, Sacramento, CA.
- Brewe, E.,** (2016). Ego Network Analysis of Upper Division Physics Student Survey, Invited Poster Physics Education Research Conference, Sacramento, CA.
- Brewe, E.,** (2015). Including Students in Modeling Instruction, Invited colloquium in Physics Department at University of Pittsburgh, Pittsburgh, PA.
- Brewe, E.,** (2015). The Emerging Role of Network Analysis in Physics Education Research, Invited colloquium in Physics Department at North Dakota State University, Fargo, ND.
- Brewe, E.,** (2014). Engaging Students in Modeling Instruction, Invited colloquium in Physics Department at University of California - Berkeley, Berkeley, CA.
- Brewe, E.,** (2014). Engaging Students in Modeling Instruction, Invited colloquium in Physics Department at Michigan State University, Lansing, MI.
- Brewe, E.,** (2014). Modeling Physics Education Transformation as an Educational Ecosystem, Invited colloquium in CREATE for STEM Center at Michigan State University, Lansing, MI.
- Brewe, E.,** (2012). Physics Education: An Ecological Analysis, Invited colloquium at Clemson University, Clemson, SC.
- Brewe, E.,** (2012) Six Degrees: Social Network Analysis in Physics Education Research, Invited presentation at Physics Education Research Conference, Philadelphia, PA.
- Brewe, E.,** Kramer, L.H., and Wells, L. (2012) Designing Modeling Instruction into Physics Teacher Preparation, Invited presentation at Physics Education Research Conference, Philadelphia, PA.
- Brewe, E.,** Furton, K., Kramer, L.H., (2012) Modeling Instruction: A promising practice for recruitment of physics teachers, Invited presentation at Science and Math Teacher Imperative National Meeting, Alexandria, VA.

**Brewer, E.,** Finkelstein, N., Proffitt, M.E., (2012) STEM Centers, Invited panel at Science and Math Teacher Imperative National Meeting, Alexandria, VA.

**Brewer, E.,** (2012). The physics teachers dilemma: Modeling perspectives on what to teach today? Invited colloquium at University of Cincinnati, Cincinnati, OH.

**Brewer, E.** (2011). “Building sustainable systems to support underrepresented students,” Invited talk sponsored by Committee on Status of Women in Physics, at American Physical Society National Meeting, Ontario, CA.

*Sawtelle, V., Brewer, E.,* Kramer, L.H. (2011) “Sequential Logistic Regression: Predicting Success Through Self-Efficacy and Gender,” Invited talk, American Association of Physics Teachers Winter Meeting, Jacksonville.

**Brewer, E.,** Kramer, L.H. O'Brien, G.E. (2011) “Building an Educational Ecosystem that Fosters Growth of Physics Majors,” Invited talk, American Association of Physics Teachers Winter Meeting, Jacksonville.

Wells, L., Kramer, L., O'Brien, G.E., **Brewer, E.** (2011) “Undergraduate STEM Reform Drives Transformation of Physics Teacher Programs,” Invited talk, American Association of Physics Teachers Winter Meeting, Jacksonville.

**Brewer, E.,** Kramer, L.H. O'Brien, G.E. (2010) “Changing Participation through Formation of Student Learning Communities,” Targeted Poster, Physics Education Research Conference, Portland.

**Brewer, E.,** (2009). “Moving Beyond the classroom: Socio-cultural motivation for expanding the unit of analysis,” Invited poster, Physics Education Research Conference, Ann Arbor, MI.

#### Contributed Presentations/Posters - National Meetings

**Brewer, E.,** Hazari, Z., Goertzen, R.M., Hodapp, T., and Ikehara, A. (2019) . Building Student Networks through CUWiP. Poster presented at American Association of Physics Teachers Conference, Provo, UT.

**Brewer, E.,** Galloway, R., Hardy, J., Wood, A., Young, C., and Elley, E. (2019) Instructional fingerprinting, network analysis of Framework for Interactive Learning in Lectures (FILL) data. Poster presented at Physics Education Research Conference, Provo, UT.

*Commeford, K., Brewer, E.,* Traxler, A. (2018) Characterizing Active Learning in Physics, Talk presented at American Association of Physics Teachers National Conference, Washington, DC.

*Price, V. E., Brewer, E.,* Hazari, Z., Hodapp, T., Goertzen, R.M., (2018) What attracts women to physics? Poster presented at Physics Education Research Conference National Meeting, Washington DC.

**Brewe, E.**, (2012). "A Model-centric Ontology for Physics" 85th National Association of Research in Science Teaching International Conference, Indianapolis, IN.

*Manthey, S.*, & **Brewe, E.** (2011). Modeling a bacterial cell: An introduction to a model-based curriculum for biology. Poster session presented at the annual meeting of the National Association of Biology Teachers Conference, Anaheim, CA.

*Rodriguez, I.*, Goertzen, R.M., **Brewe, E.**, Kramer, L.H. "Stages of Participation as Stages of Expertise," Contributed talk presented at the annual American Association of Physics Teachers Conference, Omaha, NE, July 2011

*Rodriguez, I.*, Goertzen, R.M., **Brewe, E.**, Kramer, L.H. "Communicating Scientific Ideas: One Element of Physics Expertise," Contributed poster presented at the annual Physics Education Research Conference, Omaha, NE, July 2011

*Samuels, N.*, *Manthey, S.*, **Brewe, E.** "Cogenerative Teaching in a Physics and Everyday Thinking Course," Contributed talk presented at the annual American Association of Physics Teachers Conference, Omaha, NE, July 2011.

Goertzen, R.M., **Brewe, E.**, Kramer, L.H., (2011). "Investigating the Creation of a Community of Physics Learners Contributed Poster," 84th National Association of Research in Science Teaching International Conference, Orlando.

*Rodriguez, I.*, **Brewe, E.**, Kramer, L.H., (2011). "Physics as a Community of Practice: A Qualitative Interview Study of Three University Physics Professors," 84th National Association of Research in Science Teaching International Conference, Orlando

*Sawtelle, V.*, **Brewe, E.**, Goertzen, R.M., Kramer, L.H., (2011). "Characterizing Self-Efficacy Opportunities in the Process of Modeling a Physical Phenomenon: A Study of Three Female Modeling Instruction Students." 84th National Association of Research in Science Teaching International Conference, Orlando

*Durden, J.L.*, **Brewe, E.**, Kramer, L.H., (2011). "Seeding: Understanding Discourse Management in Modeling Instruction," Contributed Talk, American Association of Physics Teachers Winter Meeting, Jacksonville.

Goertzen, R.M., **Brewe, E.**, Kramer, L.H., (2011). "Understanding an Individual's Sense of Community," Contributed poster, American Association of Physics Teachers Winter Meeting, Jacksonville.

*Durden, J.L.*, **Brewe, E.**, Kramer, L.H., (2010). Negotiating the Reference Frame Shift: Impact of Appearance on Instruction, Contributed Poster, American Association of Physics Teachers Summer Meeting, Portland.

*Sawtelle, V.*, **Brewe, E.**, Kramer, L.H. (2010). Predicting Success from Sources of Self-Efficacy: A Gender Study, Contributed Poster, American Association of Physics Teachers Summer Meeting,

Portland.

- Samuels, N., Brookes, D.T., Lin, Y., **Brewe, E.**, Kramer, L.H. (2010)* A tool aid instructors and students to negotiate learning environments, American Association of Physics Teachers Summer Meeting, Portland.
- Rodriguez, I., **Brewe, E.**, Kramer, L.H., (2010).* Becoming a Physics Expert: A Qualitative Interview Study, American Association of Physics Teachers Summer Meeting, Portland
- Sawtelle, V., **Brewe, E.**, Kramer, L.H. (2010).* Positive Impacts of Modeling Instruction on Self-Efficacy, Contributed Poster, Physics Education Research Conference, Portland.
- Crenshaw, D., Wells, L., **Brewe, E.**, Kramer, L.H., (2010).* Pedagogical Concepts and Strategies Evidenced in Learning Assistant Teaching Reflections, Contributed Poster, Physics Education Research Conference, Portland.
- Samuels, N., **Brewe, E.**, Kramer, L.H., (2010).* Creating Classroom Reform Using a Sociocultural Mediation Process, Contributed Poster, Physics Education Research Conference, Portland.
- Durden, J., **Brewe, E.**, Goertzen, R.M., Kramer, L., (2010).* Redefining the Instructor's Role as a "Transient" Group Member, Contributed Poster, Physics Education Research Conference, Portland.
- Rodriguez, I., **Brewe, E.**, Kramer, L.H., (2010).* Constructing a Physics Expertise Model Contributed Poster, Physics Education Research Conference, Portland.
- Brewe, E.**, Kramer, L.H. O'Brien, G.E. (2010) Establishing educational ecosystems: Evidence from physics education reform, Contributed Talk, American Educational Research Association National Meeting Denver, 2010.
- Kramer, L., **Brewe, E.**, Brookes, D.T., Furton, K., Lichter, J., Weeks, O., (2010).* Transforming undergraduate and faculty practices through Scientific Learning, Contributed Poster, Howard Hughes Medical Institute Undergraduate Science Education Program Undergraduate Program Directors and Professors Meeting, Washington, DC.
- Edward, J., **Brewe, E.**, DiLascio, J., Kramer, L., (2010).* GEMS: a Noyce Project in South Florida, Contributed Poster, National Science Foundation Robert Noyce Teacher Scholarship Program Conference.
- Brewe, E.**, Kramer, L., (2010). Modeling Instruction in Introductory Physics, The MORE Conference, Chicago.
- Sawtelle, V., **Brewe, E.**, & Kramer, L. (2009).* "I Think I Can: Investigating the Impact of Physics Problem Solving on Student Self-efficacy," Contributed poster, Physics Education Research Conference, Ann, Arbor, MI.
- Rodriguez, I., Palencia, J., **Brewe, E.**, Kramer, L., O'Brien, G., & Wells, L. (2009).* "Impact of the FIU

PhysTEC Reform of Introductory Physics Labs,” Contributed poster, Physics Education Research Conference, Ann, Arbor, MI.

**Brewer, E.**, (2009). “Investigating Student Communities with Network Analysis of Interactions in a Physics Learning Center,” Contributed poster, Physics Education Research Conference, Ann, Arbor, MI.

*Samuels, N.*, Rodriguez, L., **Brewer, E.**, & Kramer, L. (2009). “Take My Survey, Please!: Comparison of Survey Response Rates Across Four Administration Factors,” Contributed poster, Physics Education Research Conference, Ann, Arbor, MI.

#### Contributed Presentations/Posters - Regional Meetings

Goertzen, R.M., **Brewer, E.**, Kramer, L.H. (2011). Transforming Participation: A Case Study of an Introductory Physics Student in a Modeling Instruction Class, Contributed talk, COERC 2011: The Tenth Annual College of Education and Graduate Student Network Research Conference, Miami.

*Sawtelle, V.*, **Brewer, E.**, Kramer, L.H., (2011). Sequential Logistic Regression: A Method to Reveal Subtlety in Self-Efficacy, Contributed Talk, COERC 2011: The Tenth Annual College of Education and Graduate Student Network Research Conference, Miami.

*Samuels, N.*, **Brewer, E.**, (2011). Classroom Reform With CMPLE: A Cogenerative Mediation Process for Learning Environments, Contributed Talk, COERC 2011: The Tenth Annual College of Education and Graduate Student Network Research Conference, Miami.

**Brewer, E.**, (2009). “Questions and methods: toward the frontiers in PER,” Session organizer & planner, Foundations and Frontiers of Physics Education Research Conference, Bar Harbor, ME.

**Brewer, E.**, (2009). “Threading Energy through the introductory physics curriculum,” Physics Education Research Group Colloquium at University of Maryland.

**Brewer, E.**, (2009). “The role of Modeling Instruction in establishing supportive environments for traditionally underrepresented students,” National Association of Research in Science Teaching, Garden Grove, CA.

**Brewer, E.**, (2008). “Modeling Instruction in introductory physics,” Physics department colloquium at Florida International University.

**Brewer, E.**, (2008). “Model building and use in introductory physics,” Invited talk, Science and Math Teacher Conference, Orono, ME.

**Brewer, E.**, (2008). “Modeling Workshop,” Invited Workshop, Universidad Tecnologico de Monterrey, MX.

**Brewer, E.**, (2008). “CHEPREO: A research and learning community realized,” Contributed poster, PhysTEC National Conference, Austin, TX.

- Brewe, E.,** (2007). “Using educational outreach as a kernel for growing community at a Hispanic-Serving Institution,” Invited poster, Physics Education Research Conference, Edmonton, Canada.
- Brewe, E.,** (2007). “Modeling, the genesis of Models and the relationship with Cognitive Science,” Invited poster, Physics Education Research Conference, Greensboro, NC.
- Brewe, E.,** (2006). “From physics to physiology, a spread of curricular reform,” contributed poster, Physics Education Research Conference, Syracuse, NY.
- Brewe, E.,** (2005). “Group problem-solving, a manifestation of Vygotsky’s Zone of Proximal Development?” contributed poster, Foundations and Frontiers of Physics Education Research, Bar Harbor, ME.
- Brewe, E.,** (2005). “Social construction of knowledge in a physics class,” contributed talk, AAPT National Meeting, Salt Lake City.
- Brewe, E.,** (2003). “The Energy Thread: An example of long-term conceptual, pedagogical and thematic coherence,” invited talk, AAPT National Meeting, Madison.
- Brewe, E.,** (2003). “Identifying expertise as a goal for introductory physics,” invited poster Physics Education Research Conference, Madison.

## **FUNDED RESEARCH**

- Identifying Motivational Factors for Undergraduate Women Pursuing Physics Degrees. PI - **Brewe, E.,** National Science Foundation, PHY 2011766, 09/01/2020-08/31/2023, \$260,221.
- RAPID Collaborative Research: Faculty Networks Supporting Rapid Transitions to Online Physics Teaching During the COVID-19 Pandemic. PI - **Brewe, E.,** Traxler, A., National Science Foundation, DUE 2027958, 05/15/2020 - 04/30/2021, \$71,895.
- Collaborative Research: Characterizing Active Learning Environments in Physics: PI - **Brewe, E.,** Traxler, A., National Science Foundation, DUE 1711017 08/01/2017-07/31/2020, \$226,343.
- Supplement to Transforming Modeling Instruction: PI – **Brewe, E.,** Kramer, L.H., National Science Foundation , DUE#1140706 7/15/2012-6/30/2015, \$26,335
- Exploring the Neural Mechanisms of Physics Learning – CoPI – **Brewe, E.,** Laird, A., Pruden, S., National Science Foundation, 8/15/14-7/31/17, \$499,943
- FIU Teach – CoPI – **Brewe, E.,** Kramer, L.H., Fernandez, M.L. National Math and Science Initiative & UTeach Institute, 1/1/2014-12/31/2019, \$1,500,000.
- Collaborative for Institutionalizing Scientific Learning at FIU- CoPI – **Brewe, E.,** Kramer, L.H.,

Lowenstein, M., Edward, J., Rein, K., Howard Hughes Medical Institute, 10/1/2014-9/30/2019, \$1,500,000.

Investigating Retention and Persistence with Network Analysis – **PI – Brewe, E.**, Kramer, L.H., National Science Foundation, PHY -1344247, 9/15/13-8/31/16, \$406,106.

Transforming Modeling Instruction: Developing Curriculum Materials for Faculty Adoption – **PI- Brewe, E.**, Kramer, L.H., Goertzen, R.M. National Science Foundation, DUE#1140706 7/15/2012-6/30/2015, \$200,000.

Pathways to Success- Kramer, L.H., **Brewe, E.**, Milani, M.: Office of Naval Research, 5/11-5/14, Awarded \$670,000.

Video Resources for Learning Assistant Development (VRLAD) PIs: Vokos, S., **Brewe, E.**, Scherr, R. Goertzen, R.M.: PhysTEC, 8/11-8/12, Awarded \$9,258.

Florida International University Science Collaborative (FSC), Principal Investigator, Kramer, L.; co-PIs, **Brewe, E.**, Brookes, D., Furton, K., Lichter, J., & Weeks, O.; Howard Hughes Medical Institute, 10/10 – 09/14, Awarded \$1,000,000.

Physics Undergraduate Reform Network Alliance (PURNA), supplement to CHEPREO, Principal Investigator – Kramer, L.; co-PI, **Brewe, E.**, National Science Foundation, 10/09-09/10, Awarded \$50,000.

Get Educators in Math and Science (GEMS), Principal Investigator – Edward, J.; co-PIs, **Brewe, E.**, Graves, P., Kramer, L., Ruikim, P.; National Science Foundation, 01/09-12/12, Awarded \$749,976.

An Inter-regional, grid-enabled, Center for High Energy Physics Research and Education Outreach at Florida International University (CHEPREO) Principal Investigator- Markowitz, P; co-PIs, **Brewe, E.**, Kramer, L, O'Brien, G., Rodriguez, J.; National Science Foundation, 09/08-08/13, Awarded \$4,980,000 – Education Outreach component is \$2,490,000.

## **OFFICES HELD IN PROFESSIONAL SOCIETIES**

President, Hawaii Association of Physics Teachers, 2004-2006

Committee Member, American Association of Physics Teachers Research in Physics Education Committee, 2009-2011.

Committee Member, American Physical Society Committee on Education, 2011-2013.

Advisory Panelist, FIU Center for Art of Teaching, 2011-present.

Advisory Panelist, PERCentral website design, 2012-2014.

Organizing Committee, Chair, Topical Group on Physics Education Research, APS, 2012-14.

Secretary, American Modeling Teacher Association, 2013-2014.

Advisory Board Member, Introductory Physics for Life Science Conference, 2013-2014.

Member, APS Task Force on the April Meeting, 2013-2014.

Chair, APS Topical Group on Physics Education Research, 2014.

External Evaluator APS Conferences for Undergraduate Women in Physics (2014-present)

Past-Chair, APS Topical Group on Physics Education Research, 2015.

Chair, APS Education Policy Committee, 2017-2018.  
 Editorial Board Member, Physical Review - Physics Education Research, 2017-2019.  
 Rochester Institute of Technology, Physics Department Advisory Board Member, 2017.  
 Research Committee, American Modeling Teachers Association, 2017-2019.  
 National Advisory Board, Introductory Physics for Life Sciences Portal, 2017-2020.  
 Advisory Committee, Longitudinal study of IPLS - Swarthmore, 2017-2020.  
 Advisory Committee, Next Generation PET, 2016-2020.  
 External Evaluator, PhysTEC, 2017-2018.  
 National Advisory Committee, STEP UP Project, 2018-present.  
 American Physical Society, Forum on Education, Vice Chair, 2020.  
 American Physical Society, Forum on Education, Chair Elect, 2021.  
 American Physical Society, Committee on Education, 2021-present.  
 International Handbook on Physics Education Research - Section Co-Editor - with Eugenia Etkina, 2021  
 Physics Education Research Conference Co-organizer, 2021

### **HONORS AND AWARDS**

Florida International University, Top Scholar, 2014.  
 American Physical Society, Five Sigma Award for Outstanding Physics Policy Advocacy, 2018.  
 American Physical Society, Fellow, 2018.  
 American Physical Society, Outstanding Referee, 2020.

### **OTHER PROFESSIONAL ACTIVITIES AND PUBLIC SERVICE**

**Reviewer:** American Journal of Physics  
 American Physical Society – PhysTEC  
 CBE-Life Science Education  
 Complexity  
 European Journal of Physics  
 Evidence and Policy  
 International Journal of Science Education  
 Journal of Educational Psychology  
 National Science Foundation  
 Physical Review –Physics Education Research  
 Physica A  
 Physics Education Research Conference  
 The Physics Teacher  
 Science Education

**Member:** American Association of Physics Teachers  
 American Physical Society  
 International Network of Social Network Analysis  
 Network Science Society

### **Undergraduate Research Students**

Nadia Lustig	Physics	5/2009-8/2009
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Maria Paula Angarita	Physics	9/2011- 5/2011
Sean Stewart	Physics	9/2011- 8/2013
Jonathan Mahadeo	Physics	9/2011- 9/2014
Owen McCrossan	Physics	9/2017- 6/2018
Roy Smith	Physics	9/2018- 6/2019
Tuong Lam	Physics	9/2019- 6/2020
Adam Ikehara	Physics	9/2018- present
Sarah Scanlin	Engineering	5/2020-8/2020

### Graduate Student Advisees

Vashti Sawtelle**	Ph.D. Physics	December 2011
Idaykis Rodriguez**	Ph.D. Physics	May 2013
Geraldine Cochrane	Ph.D. Curriculum & Instruction	December 2013
Teo Cooper	Ed.D. Curriculum & Instruction	May 2015
Seth Manthey	Ph.D. Curriculum & Instruction	December 2015
Binod Nainabasti	Ph.D. Physics	December 2016
Remy Dou	Ph.D. Curriculum & Instruction	May 2017
Feng Li	Ph.D. Curriculum & Instruction	December 2017
Daryl McPadden***	Ph.D. Physics	May 2018
Jessica Bartley	Ph.D. Physics	December 2018
Kelley Commeford	Ph.D. Physics	March 2021
Virginia Price	Ph.D. Physics	(anticipated 2022)
Justin Gambrell	Ph.D. Physics	(anticipated 2024)
Maxwell Franklin	Ph.D. Physics	(anticipated 2025)
Colin Green	M.S. Physics	(anticipated 2022)
Jillian Mellen	M.S. Physics	(anticipated 2022)

\*\* Recognized as Worlds Ahead Graduate

\*\*\*National Science Foundation Graduate Research Fellowship Awardee

### Post-Doctoral Researcher Mentored

Renee-Michelle Goertzen, Adrienne Traxler, Hagit Kornreich-Leshem, Justyna Zwolak, Seth Manthey

### Collaborators

Jessica E. Bartley, (FIU); Emily R. Boeving (FIU); Katherine L. Bottenhorn (FIU); Elsa I. Bravo (FIU); David Brookes (Chico); Jesper Bruun (University of Copenhagen); Geraldine Cochrane, (Florida International University); Kelley Commeford (Drexel); Todd J. Cooke, (University of Maryland); Melissa Dancy, (University of Colorado); Jorge de la Garza (Monterrey); Remy Dou, (FIU); Jared Durden; Thomas Foster, (Southern Illinois University); Kenneth Furton, (FIU); Renee Michelle Goertzen, (American Physical Society); Kathy Harper, (The Ohio State University); Zahra Hazari (FIU); Charles Henderson, (Western Michigan University); Theodore Hodapp (APS); Leon Hsu, (University of Minnesota); David Jones, (FIU); Laird H. Kramer, (FIU); Angela R. Laird, (FIU); Robert W. Laird, (FIU); May Lee, (University of Colorado); Daryl McPadden (Michigan St. Univ.); Seth Manthey, (FIU); Binod Nainabasti (FIU); Alina Nazareth (FIU); George E. O'Brien, (FIU); Rosalie Odean (FIU); Priscilla Pamela (FIU); Nancy J. Pelaez (Purdue); Geoff Potvin (FIU); Virginia E. Price (Drexel); Shannon M. Pruden (FIU); Idaykis Rodriguez, (FIU); Nathan Samuels, (FIU); Cody

Sandifer (Towson University); Vashti Sawtelle, (Michigan State University); Robert Shand (the Ohio State Univ.); Matthew T. Sutherland (FIU); Adrienne Traxler (Wright St.); Leanne Wells (FIU); Eric Williams, (FIU); Justyna Zwolak, (NIST); Michael Zwolak (NIST).