ERIC BREWE

Professor of Physics and Science Education
Drexel University

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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	Professor	Physics & Science Education	9/22-present
Drexel University	Associate Dean, Graduate Education	CoAS	9/23-present
Drexel University	Associate Prof.	Physics & Science Education	01/17-8/22
Florida International Univ.	Assc. 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

PUBLICATIONS IN DISCIPLINE

Articles:

1. *Franklin, M.,* **Brewe, E.**, (2024 - Under Review 10 October 2023) What correlates with persistence of women in physics?. *Physical Review Physics Education Research*

2. *Gambrell, J.,* **Brewe, E.,** (2024) Analyzing interviews on computational thinking for introductory physics students: Towards a generalized assessment. *Physical Review Physics Education Research.* 20(1), 010128, [21 pages], doi: https://doi.org/10.1103/PhysRevPhysEducRes.20.010128.

3. *Green, C.*, *Mellen, J.*, Scanlin, S., Traxler, A.L., & **Brewe, E**. (2024) Sentiment and thematic analysis of faculty responses; transition to online learning. *Physical Review Physics Education Research* 20(1), 010151, [15 pages], doi: https://doi.org/10.1103/PhysRevPhysEducRes.20.010151.

4. *Smith DD*, Meca A, Bottenhorn KL, Bartley JE, Riedel MC, Salo T, Peraza JA, Laird RW, Pruden SM, Sutherland MT, **Brewe E,** Laird AR. (2023) Task-based attentional and default mode connectivity associated with science and math anxiety profiles among university physics students. Trends Neurosci Educ. 2023 Sep;32:100204. doi: https://doi.org/10.1016/j.tine.2023.100204.

5. *Franklin, M.*, **Brewe, E.**, Ponnock, A.R. (2023) Examining reasons undergraduate women join physics. *Physical Review Physics Education Research* 19(1), 010110, [9 pages], doi: https://doi.org/10.1103/PhysRevPhysEducRes.19.010110

6. **Brewe, E.**, Etkina, E., Neumann, K., (2023) Holistic Learning Environments. International Handbook for Physics Education Research

7. Biswas, S., Benabentos, R., **Brewe, E.**, Potvin, G., Edwards, J., Kravec, M., Kramer, L.H. (2022). Institutionalizing evidence-based STEM reform through faculty professional development and support structures. *International Journal of STEM Education* 9(1), [36 pages], doi: https://doi.org/10.1186/s40594-022-00353-z

8. *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

9. *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

10. **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

11. Traxler, A.L., Suda, T., **Brewe, 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

12. Hazari, Z., Chari, D., Potvin, G., and **Brewe, 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

13. McPadden, D., **Brewe, 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

14. *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., **Brewe, 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

15. *Williams, E.*, Zwolak, J., Dou, R., and **Brewe, 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

16. Rodriguez, A.L., Stephans, D.P., **Brewe, 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

17. 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., **Brewe, 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

18. Aycock, L.M., Hazari, Z., **Brewe, 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

19. **Brewe, 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

20. McPadden, D., Dowd, J., & **Brewe, E**. (2018). Power Boxes: New representation for analyzing DC circuits. *The Physics Teacher* 56(6), 362-366, https://doi.org/10.1119/1.5051147

21. *Bartley, J. E.*, Boeving, E.R., Riedel, M.C., Bottenhorn, K.L., Salo, T., Eickhoff, S.B., **Brewe, 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

22. Dou, R., **Brewe, 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

23. **Brewe, 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.

24. **Brewe, 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.

25. Zwolak, J., Zwolak, M., & **Brewe, 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

26. **Brewe, 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.

27. *McPadden, D.*, & **Brewe, 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

28. Zwolak, J.P., Dou, R., *Williams, E.A.*, **Brewe, 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

29. Hazari, Z., Goertzen, R.M., **Brewe, 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

30. **Brewe, 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.

31. *Dou, R.*, **Brewe, 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.

32. Traxler, A., **Brewe, 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.

33. *Rodriguez, I.*, Goertzen, R.M., **Brewe, 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.

34. **Brewe, 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.

35. Bruun, J., & **Brewe, E.** (2013). Talking and learning physics: Predicting future grades from network measures and FCI pre-test scores, *Physical Review Special Topics – Physics Education* 9(2), 020109, [13 pages], doi: https://doi.org/10.1103/PhysRevSTPER.9.020109.

36. **Brewe, 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.

37. *Manthey, S.*, **Brewe, 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

38. *Sawtelle, V.*, **Brewe, 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.

39. Goertzen, R.M., **Brewe, 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

40. *Sawtelle, V.*, **Brewe, 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

41. *Rodriguez, I.*, **Brewe, 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.

42. **Brewe, 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.

43. Goertzen, R., **Brewe, 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

44. **Brewe, 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

45. Kramer, L.H., O'Brien, G.E., **Brewe, E**. (2010). The physics of change: Integrating science students into learning communities, *The Advocate,* 27(6), 5-8.

46. 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., Bhaijee, S., Alberte, J., Graves, P., Gomez, R., Koptur, S., Galvez, M., Heffernan, J., Kos, L., Lowenstein, M., Rosenblatt, A., Baker, J., Quirke, M., **Brewe, E**., Tashakkori, A., (2010). QBIC, an interdisciplinary and quantitative biological sciences curriculum: concept to implementation. *Journal of Science Education, 12(1)*, 11-14.

47. **Brewe, 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.

48. **Brewe, 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.

49. *Sawtelle, V.*, **Brewe, 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.

50. **Brewe, 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.

51. Hsu, L., **Brewe, 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.

52. **Brewe, 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.

Conference Proceedings

1. *Hatcher, C.,* Price, E., Smith, P. S., Turpen, C., & **Brewe, E.,** (2022) Social network analysis of a faculty online learning community, *2022 Physics Education Research Conference Proceedings* [Grand Rapids, MI, July 2022] edited by Frank, B.W., Jones, D.L., & Ryan, Q.X., doi: 10.1119/perc.2022.pr.Hatcher

2. *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., doi:10.1119/perc.2021.pr.Franklin.

3. *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

4. 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.

5. 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.

6. 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.

7. *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.

8. *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.

9. 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.

10. *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.

11. *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.

12. *Samuels,N.,* **Brewe, 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.

13. *Mahadeo, J.V., Manthey, S.R.,* & **Brewe, 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.

14. *Sawtelle, V*., **Brewe, 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.

15. *Rodriguez, I*., Goertzen, R. M., **Brewe, 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

16. *Durden, J*., **Brewe, 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.

17. Lee. M., Dancy, M., Henderson, C., and **Brewe, 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.

18. *Sawtelle, V.,* **Brewe, 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.

19. *Rodriguez, I.,* **Brewe, 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.

20. **Brewe, 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.

21. **Brewe, 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.

22. *Sawtelle, V.*, **Brewe, 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.

23. **Brewe, 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.

24. Wells, L., Valenzuela, R., **Brewe, 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.

25. Dancy, M., **Brewe, 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., & **Brewe, 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.

Brewe, 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.

Brewe, 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

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

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

Invited Talks/Posters - National Meetings

Brewe, 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.

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

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

Brewe, 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., **Brewe, 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.

Brewe, 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., **Brewe, E.** (2011) "Undergraduate STEM Reform Drives Transformation of Physics Teacher Programs," Invited talk, American Association of Physics Teachers Winter Meeting, Jacksonville.

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

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

<u>Contributed Presentations/Posters - National Meetings</u>

Brewe, 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.

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

Price, V. E., **Brewe, 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.

Brewe, 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., **Brewe, 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., **Brewe, 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., **Brewe, 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., **Brewe, 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.

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

Brewe, E., (2009). "Threading Energy through the introductory physics curriculum," Physics Education Research Group Colloquium at University of Maryland.

Brewe, 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.

Brewe, E., (2008). "Modeling Instruction in introductory physics," Physics department colloquium at Florida International University.

Brewe, E., (2008). "Model building and use in introductory physics," Invited talk, Science and Math Teacher Conference, Orono, ME.

Brewe, E., (2008). "Modeling Workshop," Invited Workshop, Universidad Technologio de Monterrey, MX.

Brewe, 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

Moore Foundation Experimental Physics Investigator Evaluation Project: PI – **Brewe, E.,** Gordon and Betty Moore Foundation, 5/2024-4/25, $62,406.

Collaborative Research: Further Characterizing Active Learning Environments in Physics: PI - **Brewe, E.**, Traxler, A., National Science Foundation, DUE 2111128 10/01/2022-09/30/2025, $464,597.

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

FIUTeach – 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
American Physical Society, Forum on Education, Chair, 2022.
American Physical Society, Committee on Education, Co-Chair, 2022.
Physical Review Physics Education Research, Statistical Modeling Review Committee, 2022-2023,
American Physical Society, Forum on Education, Past Chair, 2023
Associate Editor, Physical Review Physics Education Research, July 2023-present

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.
Provost Fellow, Drexel Solutions Institute, 2022

OTHER PROFESSIONAL ACTIVITIES AND PUBLIC SERVICE

Reviewer: American Journal of Physics
American Physical Society – PhysTEC
CBE-Life Science Education
Complexity
Department of Energy
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
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- 8/2022
Sarah Scanlin	Engineering	5/2020-8/2020
Soukayna Mardas	Physics	9/2022-present

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
Colin Green	M.S. Physics	June 2022
Chase Hatcher	M.S. Physics	June 2023
Justin Gambrell	Ph.D. Physics	August 2024
Maxwell Franklin***	Ph.D. Physics	(anticipated 2025)
Colin Green	Ph.D. Physics	(anticipated 2025)
Ibukun Bukola	Ph.D. Physics	(anticipated 2030)
Ian Olivet	M.S. Physics	(anticipated 2026)

** 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, Meagan Sundstrom