Curriculum Vitae

David Thomas Brookes

Work Address:
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Chico, CA 95929-0202
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Citizenship: South African
US Immigration Status: Permanent Resident

Education

Ph.D., Physics, (physics education research), 2006
Rutgers University. Dissertation Title: "The Role of Language in Learning Physics."
M.A., Physics, 1999
Brandeis University.
M.Sc., Theoretical Physics, 1997
University of Cape Town, South Africa, with distinction.
B.Sc, (honours), Theoretical Physics, 1995
University of Cape Town, South Africa.
B.Sc., Physics, and Applied Mathematics, 1994
University of Cape Town, South Africa, distinction in Applied Mathematics.

Employment History

Sept. 2016 – present:
Associate Professor of Physics, Department of Physics, California State University, Chico.
Sept. 2015 – Aug. 2016:
Lecturer, Department of Physics, California State University, Chico.
Sept. 2009 – Aug. 2015:
Assistant Professor of Physics, Florida International University.
Sept. 2006 - Aug. 2009:
Post-doctoral research associate (physics education research) Department of Physics, University of Illinois at Urbana-Champaign

Publications

Articles in Refereed Journals

Brookes, D.T, Yang, Y., & Nainabasti, B. (submitted) **Social positioning in small group interactions in an ISLE physics class.** *Physical Review Physics Education Research.*

Brookes, D.T, Etkina, E., & Planinsic, G. (accepted) **ISLE: An epistemologically authentic approach to student-centered inquiry learning.** *Physical Review Physics Education Research.*

Kagan, D., Ayars, E., & Brookes, D. (2019). **The problem with some problems.** *The Physics Teacher, 57*(2), 76-77.

Brookes, D. T., & Etkina, E. (2015). **The Importance of Language in Students' Reasoning About Heat in Thermodynamic Processes.** *International Journal of Science Education*, *37*(5-6), 759–779. http://doi.org/10.1080/09500693.2015.1025246

Rein, K. S., & Brookes, D. T. (2015). **Student Response to a Partial Inversion of an Organic Chemistry Course for Non-Chemistry Majors.** *Journal of Chemical Education*, *92*(5), 797–802. http://doi.org/10.1021/ed500537b

Landy, D., Brookes, D., & Smout, R. (2014). **Abstract numeric relations and the visual structure of algebra.** *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *40*(5), 1404–1418. http://doi.org/10.1037/a0036823

Brookes, D. T., Ross, B. H., & Mestre, J. P. (2011). **Specificity, transfer, and the development of expertise.** *Physical Review Special Topics Physics Education Research*, *7*(1), 010105. http://doi.org/10.1103/PhysRevSTPER.7.010105

Brookes, D. T., & Etkina, E. (2010). **Physical Phenomena in Real Time**. *Science*, *330*(6004), 605–606. http://doi.org/10.1126/science.1186992

Stelzer, T., Brookes, D. T., Gladding, G., & Mestre, J. P. (2010). **Impact of multimedia learning modules on an introductory course on electricity and magnetism.** *American Journal of Physics*, *78*(7), 755–759. http://doi.org/10.1119/1.3369920

Schuster, D., Adams, B., Brookes, D., Milner-Bolotin, M., & Undreiu, A. (2009). **Motion-Matching: A Challenge Game to Generate Motion Concepts.** *The Physics Teacher*, *47*(7), 434–483. http://doi.org/10.1119/1.3225502

Brookes, D. T., & Etkina, E. (2009). **Force, Ontology, and Language**. *Physical Review Special Topics Physics Education Research*, *5*(1), 010110. http://doi.org/10.1103/PhysRevSTPER.5.010110 (featured in APS "spotlighting exceptional research, June 26, 2009, see http://physics.aps.org/synopsis-for/10.1103/PhysRevSTPER.5.010110)

Stelzer, T., Gladding, G., Mestre, J. P., & Brookes, D. T. (2009). **Comparing the efficacy of multimedia modules with traditional textbooks for learning introductory physics content.** *American Journal of Physics*, *77*(2), 184–190. http://doi.org/10.1119/1.3028204

Brookes, D. T., & Etkina, E. (2007). **Using conceptual metaphor and functional grammar to explore how language used in physics affects student learning.** *Physical Review Special Topics Physics Education Research*, *3*(1), 010105. http://doi.org/10.1103/PhysRevSTPER.3.010105

Etkina, E., Van Heuvelen, A., White-Brahmia, S., Brookes, D. T., Gentile, M., Murthy, S., … Warren, A. (2006). **Scientific abilities and their assessment.** *Physical Review Special Topics Physics Education Research*, *2*(2), 020103. http://doi.org/10.1103/PhysRevSTPER.2.020103

Etkina, E., Van Heuvelen, A., Brookes, D. T., & Mills, D. (2002). **Role of Experiments in Physics Instruction — A Process Approach.** *The Physics Teacher*, *40*(6), 351–355. http://doi.org/10.1119/1.1511592

Articles in Refereed Conference Proceedings

Brookes, D. T., Hinrichs, B. E., & Nass, J. L. (2020). **Social positioning correlates with consensus building in two contentious large-group meetings.** In Y. Cao, S. Wolf, & M. B. Bennett (Eds.), *2019 Physics Education Research Conference Proceedings*. American Association of Physics Teachers. https://doi.org/10.1119/perc.2019.pr.Brookes

Nainabasti, B., Brookes, D. T., Yang, Y., & Lin, Y. (2015). **Connection between participation in an Interactive Learning Environment and learning through teamwork**. In A. D. Churukian, D. L. Jones, & L. Ding (Eds.), *Proceedings of the 2015 Physics Education Research Conference* (pp. 231–234). Melville, NY: AIP Conference Proceedings. https://doi.org/10.1119/perc.2015.pr.053

Nainabasti, B., Brookes, D. T., & Yang, Y. (2015). **Students' Participation and its Relationship to Success in an Interactive Learning Environment.** In P. V. Engelhardt, A. D. Churukian, & D. L. Jones (Eds.), *Proceedings of the 2014 Physics Education Research*

Conference (pp. 195–198). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1119/perc.2014.pr.045

Yang, Y., Nainabasti, B., Brookes, D. T., & Brewe, E. (2015). **A Study of Informal Learning Communities: a Tale of Two Physics Courses.** In P. V. Engelhardt, A. D. Churukian, & D. L. Jones (Eds.), *Prodeedings of the 2014 Physics Education Research Conference* (pp. 283–286). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1119/perc.2014.pr.067

Brookes, D. T., Nainabasti, B., & Yang, Y. (2014). **Characterizing Student Participation in an ISLE Physics Class.** In P. V. Engelhardt, A. D. Churukian, & D. L. Jones (Eds.), *Proceedings of the 2013 Physics Education Research Conference* (pp. 77–80). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1119/perc.2013.pr.007

Brookes, D. T., Moncion, A., & Lin, Y. (2013). **Interactions Leading to Learning and Transfer: A Participationist Perspective.** In P. V. Engelhardt, A. D. Churukian, & N. S. Rebello (Eds.), *Proceedings of the 2012 Physics Education Research Conference* (Vol. 1513, pp. 86–89). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1063/1.4789658

Cochran, G. L., Brookes, D. T., & Kramer, L. H. (2013). **A framework for assessing learning assistants' reflective writing assignments.** In P. V. Engelhardt, A. D. Churukian, & N. S. Rebello (Eds.), *Proceedings of the 2012 Physics Education Research Conference* (Vol. 1513, pp. 15–18). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1063/1.4789640

Lin, Y., & Brookes, D. T. (2013). **Using collaborative group exams to investigate students' ability to learn.** In P. V. Engelhardt, A. D. Churukian, & N. S. Rebello (Eds.), *Proceedings of the 2012 Physics Education Research Conference* (Vol. 1513, pp. 254–257). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1063/1.4789700

Brookes, D. T., & Lin, Y. (2012). **Designing a physics learning environment: A holistic approach.** In N. S. Rebello, P. V. Engelhardt, & C. Singh (Eds.), *Proceedings of the 2011 Physics Education Research Conference* (Vol. 1413, pp. 131–134). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1063/1.3680011

Brookes, D. T., & Etkina, E. (2012). **In Search of Alignment: Matching Learning Goals And Class Assessments.** In N. Sanjay Rebello, Paula V. Engelhardt, & Chandralekha Singh (Eds.), *Proceedings of the 2011 Physics Education Research Conference* (Vol. 1413, pp. 11–14). Melville, NY: American Institute of Physics. http://doi.org/10.1063/1.3679981

Landy, D., Brookes, D., & Smout, R. (2011). **Modeling Abstract Numeric Relations Using Concrete Notations.** In L. Carlson, C. Hoelscher, & T. F. Shipley (Eds.), *Proceedings of the 33rd annual conference of the Cognitive Science Society* (pp. 102–107). Austin, TX: Cognitive Science Society.

Brookes, D. T., & Lin, Y. (2010). **Structuring Classroom Discourse Using Formative Assessment Rubrics.** In C. Singh, M. S. Sabella, & N. S. Rebello (Eds.), *Proceedings of the 2010 Physics Education Research Conference* (Vol. 1289, pp. 5–8). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1063/1.3515248

Brookes, D. T., Ross, B. H., & Mestre, J. P. (2008). **The Specificity Effect: An Example from Refraction.** In C. Henderson, M. Sabella, & L. Hsu (Eds.), *Proceedings of the 2008 Physics Education Research Conference* (Vol. 1064, pp. 83–86). Melville, NY: American Institute of Physics. http://doi.org/10.1063/1.3021280

Etkina, E., Van Heuvelen, A., Brookes, D., Murthy, S, Karelina, A., & Ruibal-Villasenor, M. **Development and transfer of student scientific abilities.** Proceedings of the National STEM Assessment Conference: Washington DC, October 19-21, 2006. Deeds, Donald G. and Callen, Bruce W., Eds. National Science Foundation and Drury University, 2008. 68-80.

Brookes, D. T., Mestre, J. P., Stine-Morrow, E. A. L., Hsu, L., Henderson, C., & McCullough, L. (2007). **Reading Time as Evidence for Mental Models in Understanding Physics.** In *Proceedings of the 2007 Physics Education Research Conference* (Vol. 951, pp. 65–68). Melville, NY: AIP Conference Proceedings. http://doi.org/10.1063/1.2820948

Aubrecht, G. J., Demaree, D., Brookes, D., & Zou, X. (2006). **Student Perceptions of Physics by Inquiry at Ohio State.** In P. Heron, L. McCullough, & J. Marx (Eds.), *Proceedings of the 2005 Physics Education Research Conference* (Vol. 818, pp. 113–116). Melville, NY: American Institute of Physics. http://doi.org/10.1063/1.2177036

Brookes, D. T., & Etkina, E. (2006). **Do Our Words Really Matter?** Case Studies from Quantum Mechanics. In P. Heron, L. McCullough, & J. Marx (Eds.), *Proceedings of the 2005 Physics Education Research Conference* (Vol. 818, pp. 57–60). Melville, NY: American Institute of Physics. http://doi.org/10.1063/1.2177022

Brookes, D. T., Horton, G. K., Van Heuvelen, A., & Etkina, E. (2005). **Concerning Scientific Discourse about Heat.** In J. Marx, P. Heron, & S. Franklin (Eds.), *Proceedings of the 2004 Physics Education Research Conference* (Vol. 790, pp. 149–152). Melville, NY: American Institute of Physics. http://doi.org/10.1063/1.2084723

Books & Book Chapters

Etkina, E., Brookes, D. T., & Planinsic, G. (2020). Investigative Science Learning Environment: Learn physics by practicing science. In J. J. Mintzes & E. M. Walter (Eds.), *Active learning in college science: The case for evidence-based practice* (pp. 359–383). Springer International Publishing. https://www.springer.com/gp/book/9783030335991

Etkina, E., Brookes, D. T., & Planinsic, G. (2019). *Investigative Science Learning Environment When learning physics mirrors doing physics*. Morgan & Claypool. https://iopscience.iop.org/book/978-1-64327-780-6.pdf

Etkina, E., Brookes, D., Planinsic, G., & Van Heuvelen, A. (2019). *Active Learning Guide for College Physics: Explore and Apply, 2nd Edition* (2nd ed.). San Francisco, CA: Pearson.

Etkina, E., Brookes, D., Planinsic, G., & Van Heuvelen, A. (2019). *Instructor's Guide for College Physics: Explore and Apply, 2nd Edition* (2nd ed.). San Francisco, CA: Pearson.

Etkina, E., Brookes, D., Planinsic, G., & Van Heuvelen, A. (2019). *Instructor Solutions Manual for the Active Learning Guide, 2nd Edition*. San Francisco, CA: Pearson.

Etkina, E., Brookes, D., & Van Heuvelen, A. (2014). *Instructor's Guide for College Physics*. Boston: Pearson.

Funding

Externally Funded Research and/or Training Grants

09/2017 – ongoing (Grant Amount: $597,781) NSF IUSE Development and Implementation to conduct a project "Learning physics by practicing it with physical apparatus or using interactive video: is there a difference?" D. Brookes (PI), E. Ektina, M Vonk, P. Bohacek (co-PIs).

Internally Funded Research and/or Training Grants

09/2017 – 08/2018 (Grant amount $14,981) Chancellor's office "Course Redesign with Technology" grant to implement video experiments in discussion settings.

07/2014 – 05/2015 (Grant amount $380,000) FIU Tech-fee grant (PI). Implemented studio-based physics in a 96-student studio classroom.

Conference Presentations, Colloquia, and Workshops

Invited Conference Presentations

D.T. Brookes, "Effectively implementing inquiry learning: A story of integration and transformation," Baku Program Seminar Nasional, Banda Aceh, Indonesia, July 2018. [Keynote speaker]

D.T. Brookes, “The challenge of implementing education research: A holistic and dynamical systems perspective,” Physics Education Research Conference, College Park, MD, July 2015. [Plenary talk]
D.T. Brookes, Y. Yang, B. Nainabasti, “The role of social positioning and its effect on how groups function,” AAPT National meeting, College Park, MD, July 2015. [talk]
D.T. Brookes “Goals and Assessment of ISLE Labs,” AAPT National meeting, Orlando, FL, January 2014. [talk]
D.T. Brookes “Integrating ISLE Labs into a Studio Physics Classroom: Opportunities and Challenges,” AAPT National meeting, New Orleans, LA, 2013. [talk]
D.T. Brookes “The Role of ISLE Labs in a Studio Physics Classroom,” AAPT National meeting, Philadelphia, PA, July 2012. [talk]
D.T. Brookes “Assessing high-level scientific reasoning in a physics exam: Pipe-dream or reality?” APS March Meeting, Boston, MA, February 27 – March 02 2012 [talk].
D.T. Brookes “ISLE: Clear epistemic roles for laboratory experiments in physics instruction,” AAPT National meeting, Jacksonville, FL, January 07-12 2011. [talk]
D.T. Brookes “Structuring Classroom Discourse Using Formative Assessment Rubrics,” Physics Education Research Conference, Portland, OR, July 21-22 2010. [poster]
D.T. Brookes, “Language and Communication in Physics” AAPT National meeting Ann Arbor, July 22 - 25, 2009. [talk]
D.T. Brookes, J.P. Mestre, & E.A.L. Stine-Morrow, “Reading Time as Evidence for Mental Models in Understanding Physics,” Physics Education Research Conference, Greensboro, NC, August 2007. [targeted poster]
D.T. Brookes, “Transfer From Graduate Experience to Faculty Practice: one graduate student's experiences of and ideas about graduate education in physics,” Physics Education Research Conference, Sacramento, August 4-5 2004. [targeted poster]

Invited Colloquia and Seminars

D.T. Brookes, “Dabbling in the “dark arts:” A physicist does education statistics,” Colloquium, Mathematics Department, Oregon Institute of Technology, June 6, 2019.
D.T. Brookes, “Introducing ISLE, a framework for epistemologically authentic inquiry learning,” Seminar, Universitas Pendidikan Indonesia (UPI), Bandung, Indonesia, July 2018.
D.T. Brookes, “Innovation in Learning Physics for Undergraduate Students with Integration of STEM,” Physics Department Colloquium, Syiah Kuala University, Banda Aceh, Indonesia, July 2018.
D.T. Brookes, “Modeling the physics classroom as a complex-dynamical system: A path towards transformation” Physics Department Colloquium, Illinois State University, October 2013.
D.T. Brookes, “The Matrix in the Physics Classroom: Complexity and the Hidden Curriculum,” Physics Department Colloquium, Western Kentucky University, March 14, 2011.
D.T. Brookes, “Communicating Physics” HEP Lunch Seminar, University of Chicago, July 23, 2009.
D.T. Brookes, “The Role of Language in Learning Physics,” Physics Department Colloquium, University of Western Michigan, April 2008.
D.T. Brookes, “The Specificity Effect: Implications for Transfer in Physics Learning,” University of Western Michigan Mallinson Institute for Science Education seminar, April 2008.
D.T. Brookes, “Reading Time as Evidence for Mental Models in Understanding Physics,” University of Illinois at Urbana-Champaign CSTL seminar, September 2007.
D.T. Brookes, “The Role of Language in Representing and Learning Physics,” University of Illinois at Urbana-Champaign CSTL seminar, September 2006.
D.T. Brookes & E. Etkina, “Developing and Assessing Scientific Abilities with Video Problems,” The Ohio State University Physics Education Research Group seminar, December 2004.
D.T. Brookes, “The Role of Metaphor in Scientific Thought and Physics Education,” University

of Maryland Physics Education Research Group seminar, October 2003.
D.T. Brookes, "What Can Linguistics Tell Us About Knowledge Structures in Physics?" The Ohio State University Physics Education Research Group seminar, April 2003.

Contributed Talks, Posters, Papers, and Round Tables at National Conferences

D.T. Brookes, Y. Yang, & B. Nainabasti, "Impact of Social Positioning on Group Effectiveness in an ISLE Physics Class" Physics Education Research Conference, Provo, UT, July 2019 [poster]
D.T. Brookes, B.E. Hinrichs, & J.L. Nass, "Social positioning and consensus building in two contentious large-group meetings" Physics Education Research Conference, Provo, UT, July 2019 [poster]
D.T. Brookes, A.F. Karelina, E. Etkina, M. Vonk, & P. Bohacek "Can students conduct authentic scientific investigations with video experiments?" 2019 AAPT Summer meeting, Provo, UT, July 2019 [talk]
B. Hinrichs, D.T. Brookes, "Social positioning and consensus building in "board" meetings with disagreements" 2018 AAPT Summer meeting, Washington, DC, July 2018. [talk]
Y. Yang, D. Kirkendall, S Neupane, & D.T. Brookes, "The Process of Learning and Assessment in Activity-based Physics Classrooms" 2018 AAPT Summer meeting, Washington, DC, July 2018. [talk]
Y. Lin & D.T. Brookes, "Using Google Drive to Achieve Student Cooperation in Large Enrollment Introductory Physics Classes" 2018 AAPT Summer meeting, Washington, DC, July 2018. [talk]
B. Hinrichs, D.T. Brookes, "Social positioning and consensus building in "board" meetings with disagreements" 2018 AAPT Summer meeting, Washington, DC, July 2018. [Poster]
Williams, K. & Brookes, D.T., Towards a functional grammar of physics equations. *The XXI Annual Conference on Research on Undergraduate Mathematics Education, February 22-24, 2018 San Diego, CA.* [talk]
B. Hinrichs, D.T. Brookes, J. Nass, "Social positioning and consensus building in "board" meetings with disagreements" Physics Education Research Conference, Cincinnati, OH, July 2017. [Poster]
Y. Yang, S. Reed, B. Nainabasti, D.T. Brookes, "Learning assessment in a 10-week introductory physics course" AAPT National Meeting, Cincinnati, OH, July 2017. [poster]
A.J. Richards, D.T. Brookes, E. Etkina, "How students use far analogies to understand new physics concepts" AAPT National Meeting, Cincinnati, OH, July 2017. [poster]
A.J. Richards, D.T. Brookes, E. Etkina, "How students use far analogies to understand new physics concepts" AAPT National Meeting, Cincinnati, OH, July 2017. [talk]
D.T. Brookes, A.J. Richards, E. Etkina, "The challenge of making sense of mixed metaphors quantum mechanics" AAPT National Meeting, Cincinnati, OH, July 2017. [talk]
B. Hinrichs & D.T. Brookes, "Social Positioning and Consensus Building in "Board" Meetings With Disagreements" Physics Education Research Conference, Sacramento, CA, July 2016. [Poster]
D.T. Brookes & T.A. Goff "Developing valid assessments of group effectiveness," Physics Education Research Conference, Sacramento, CA, July 2016. [Poster]
B. Hinrichs & D.T. Brookes, "Social Positioning and Consensus Building in "Board" Meetings With Disagreements" AAPT National Meeting, Sacramento, CA, July 2016. [poster]
D.T. Brookes, "Specifications grading in a large-enrollment ISLE physics class" AAPT National Meeting, Sacramento, CA, July 2016. [talk]
Y. Yang, B. Nainabasti, L. Atkins, D.T. Brookes, "A study of transformative experience and its relation to student performance," Physics Education Research Conference, College Park, MD, July 2015. [Poster]

B. Nainabasti, Y. Yang, D.T. Brookes, “Connection Between Participation in Interactive Learning Environment and Learning through Teamwork,” Physics Education Research Conference, College Park, MD, July 2015. [Poster]

D.T. Brookes, B. Nainabasti, Y. Yang, “Positioning and Discussion in Effective Group Interactions” Physics Education Research Conference, Minneapolis, MN, July 2014. [Poster]

Y. Yang, B. Nainabasti, D.T. Brookes, “Study of Informal Learning Communities: A Tale of Two Physics Courses” Physics Education Research Conference, Minneapolis, MN, July 2014. [Poster]

D.T. Brookes, B. Nainabasti, Y. Yang, “Positioning and discussion in effective group interactions” Physics Education Research Conference, Minneapolis, MN, July 2014. [Poster]

B. Nainabasti, D.T. Brookes, Y. Yang, “Students’ participation in a physics class and its relationship to learning” Physics Education Research Conference, Minneapolis, MN, July 2014. [Poster]

Y. Yang, B. Nainabasti, D.T. Brookes, “Study of Informal Learning Communities and its Reflection on Learning” AAPT National Meeting, Minneapolis, MN, July 2014. [talk]

D.T. Brookes, B. Nainabasti, Y. Yang, “Quantifying Patterns of Interaction in a Studio-based ISLE Physics Class” AAPT National Meeting, Minneapolis, MN, July 2014. [talk]

B. Nainabasti, K. Kadel, C. Williams, D.T. Brookes, Y. Yang, “Analyzing Physics Students’ Interaction Patterns in an ISLE Studio Class” AAPT National Meeting, Minneapolis, MN, July 2014. [talk]

A.L. Traxler, L. Kramer, E. Brewe, D. Brookes, J. Lichter, “Research-based reform: Faculty as Change agents in Multiple departments” AAPT National Meeting, Minneapolis, MN, July 2014. [talk]

B. Nainabasti & D.T. Brookes, “Spontaneous formation of learning communities and its reflection on learning” AAPT National meeting, Orlando, FL, January 2014. [talk]

D.T. Brookes, B. Nainabasti, Y. Yang, “Characterizing Student Participation in an ISLE Physics Class” Physics Education Research Conference, Portland, OR, July 2013. [poster]

B. Nainabasti & D.T. Brookes, “The Role of Participation in Performance” Physics Education Research Conference, Portland, OR, July 2013. [poster]

G.L. Cochran, L. H. Kramer, D.T. Brookes, & E. Brewe, “Physics Learning Assistants – Discuss the Value of the LA Program” AAPT National meeting, Portland, OR, July 2013. [talk]

B. Nainabasti & D.T. Brookes, “The Role of Participation in Experimental Design and Problem Solving” AAPT National meeting, Portland, OR, July 2013. [talk]

G.L. Cochran, D.T. Brookes, E. Brewe, & L.H. Kramer, “Understanding Physics Learning Assistants’ Perspectives on Teaching, Reflection, and Expertise,” AAPT National meeting, New Orleans, LA, 2013. [talk]

R.M. Goertzen, E. Brewe, D.T. Brookes, & L. Kramer, “Eliciting Physics Faculty Expectations for Physics Majors,” AAPT National meeting, Philadelphia, PA, July 2012. [talk]

Y. Lin & D.T. Brookes, “Fostering and Assessing Student Self-Directed Learning in a Physics Class,” AAPT National meeting, Philadelphia, PA, July 2012. [talk]

G. Cochran, D.T. Brookes, E. Brewe, & L.H. Kramer, “A Q Approach to Understanding Physics LAs' Views on Teaching,” AAPT National meeting, Philadelphia, PA, July 2012. [talk]

G. Cochran, E. Brewe, L. Kramer, & D.T. Brookes, “Assessing the reflective practice of prospective teachers through written reflections,” NARST International Conference, Indianapolis, March 2012 [talk].

G. Cochran, D. Brookes, E. Brewe, & L. Kramer, “Physics Learning Assistants’ perspectives on development of reflective teaching practice,” AAPT National Meeting, Ontario, CA, Feb 2012 [talk].

R.M. Goertzen, E. Brewe, D.T. Brookes, L. Kramer, “Investigating Departmental Expectations for Physics Undergraduate Students,”, AAPT National Meeting, Ontario, CA, Feb 2012 [talk].

R.M. Goertzen, E. Brewe, D.T. Brookes, L. Kramer, "Investigating Departmental Expectations for Physics Undergraduate Students," AAPT National Meeting, Ontario, CA, Feb 2012 [poster].

L. Kramer, E. Brewe, D.T. Brookes, K. Furton, J. Lichter, S. Rose, & O. Weeks, "Institutionalizing Reform: Investing in Faculty Instructional Practices," Physics Education Research Conference 2011, Omaha, NB, August 2011 [poster].

D.T. Brookes & Y. Lin, "Designing a physics learning environment with a holistic approach," AAPT National Meeting, Omaha, NE, July 30 – August 3, 2011 [talk].

L. Kramer, E. Brewe, D.T. Brookes, K. Furton, J. Lichter, S. Rose, & O. Weeks, "Institutionalizing Reform: Investing in Faculty Instructional Practices," Foundations and Frontiers of Physics Education Research Conference, Bar Harbor, June 2011 [poster].

D.T. Brookes, (organizer and discussant) "Epistemology in the Hidden Curriculum, Why should one care?" Physics Education Research Conference, Portland, OR, July 21-22, 2010 [round table].

Y. Lin & D.T. Brookes, "Redesigning and Restructuring classroom assessments to reflect a new set of learning goals," Physics Education Research Conference, Portland, OR, July 21-22, 2010 [poster].

N. Samuels, D.T. Brookes, Y. Lin, E. Brew, & L. Kramer, "A tool aid instructors and students to negotiate learning environments," AAPT National meeting, Portland, OR, July 17-21, 2010 [talk].

Y. Lin, N. Samuels, & D.T. Brookes, "Drawing out the expert learner in physics students," AAPT National meeting, Portland, OR, July 17-21 2010 [talk].

D.T. Brookes, D.H. Landy, & J.P. Mestre "How students' conceptual understanding is influenced by the grammatical structure of physics equations," Physics Education Research Conference, Portland, OR, July 21-22, 2010 [poster].

D.T. Brookes, D.H. Landy, & J.P. Mestre "If Mathematics is the Language of Physics, Does it have a Grammar?" AAPT National Meeting, Portland, OR, July 17-21, 2010 [talk].

D.T. Brookes, J.P. Mestre, & E.A.L. Stine-Morrow, "The semantics of "force" and how it relates to students' reasoning about Newton's third law," AAPT National meeting Ann Arbor, July 22 - 25, 2009. [talk].

T. Stelzer, D.T. Brookes, G. Gladding, & J.P. Mestre, "Multimedia Learning Modules Improve Student Exam Performance in E&M," AAPT National meeting Chicago, 2009. [talk].

D.T. Brookes, B.H. Ross, & J.P. Mestre, "The Specificity Effect: Separating Efficiency from Innovation in Learning Physics," AAPT National meeting Chicago, 2009. [talk].

D.T. Brookes, B.H. Ross, & J.P. Mestre, "The Specificity Effect: Implications for Transfer in Physics Learning," AAPT National Meeting, Edmonton, July 19 - 23, 2008 [talk].

T. Stelzer, D.T. Brookes, G. Gladding, & J.P. Mestre, "Efficacy of Multimedia Learning Modules in Introductory Electricity and Magnetism," AAPT National Meeting, Edmonton, July 19 - 23, 2008 [talk].

D. Schuster, A. Undreiu, B. Adams, D.T. Brookes, & M. Milner-Bolotin, "Motion Reproduction: A Challenge Activity to Generate Motion Descriptor Concepts," AAPT National Meeting, Edmonton, July 19 - 23, 2008 [talk].

D.T. Brookes, "Understanding student difficulties by listening to what they are saying," AAPT National Meeting, Greensboro, NC, July 29 - August 1, 2007 [poster].

Y. Lin & D.T. Brookes, "Re-conceiving how teachers teach, and how students learn physics with analogies," AAPT National Meeting, Greensboro, NC, July 29 - August 1, 2007 [poster].

G.J. Aubrecht, D. Demaree, Y. Lin, D.T. Brookes & Z Zou, "Making Sense of Students' Thoughts About a Class's Goals," AAPT National Meeting, Anchorage, 2006 [talk].

D.T. Brookes & E. Etkina, "Students' Difficulties with Force: A New Look at Old Data," AAPT National Meeting, Salt Lake City, August 6 - 10, 2005 [talk].

D.T. Brookes & E. Etkina, "Linguistic Representations in Students' Reasoning About Heat in Thermodynamics," AAPT National Meeting, Salt Lake City, August 6 - 10, 2005 [poster].
D.T. Brookes & E. Etkina, "Physicists' language about "force": An alternative view of students' difficulties," AAPT National Meeting, Albuquerque, January 8 - 12, 2005 [poster].
D.T. Brookes, "Do we say what we mean? Misclassification of Physics Concepts and Students' Difficulties," AAPT National Meeting, Sacramento, July 31 - August 4, 2004 [talk].
D.T. Brookes, M. Lawrence, J. Timofeeva, & E. Etkina, "Video Problems: A New Type of Context-Rich Problem," AAPT National Meeting, Sacramento, July 31 - August 4, 2004 [poster].
D.T. Brookes, "Linguistics and the Epistemology of Physics," AAPT National Meeting, Madison, August 2-6, 2003 [talk].
D.T. Brookes, "The Role of Metaphor in Scientific Thought and Physics Education" AAPT National Meeting, Madison, August 2-6, 2003 [poster].
D.T. Brookes, E. Etkina & S. Barnhart, "Integrating Video Technology Effectively into Instruction," Society For Information Technology & Teacher Education – 14th International Conference, Albuquerque, March 24-29, 2003 [talk & paper].
D.T. Brookes, "What can Linguistics Tell Us About Knowledge Structures in Physics?" AAPT National Meeting, Austin, January 11-15, 2003 [talk].
S. Barnhart, D. Brookes, & E. Etkina, "Constructing Scientific Models During Teacher Preparation." In D. Willis et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2002* (pp. 1589-1590). Chesapeake, VA: AACE, 2002 [paper].
D.T. Brookes, "Historical Analysis of the Development of Some Fundamental Concepts in Quantum Mechanics: Educational Perspectives," AAPT National Meeting, Boise, August 3-7 2002 [talk].
D.T. Brookes & E. Etkina, "In Search of Strange Things: Slowed World Poses Interesting Questions," AAPT National Meeting, Philadelphia, January 19-23, 2002 [talk].
A. Van Heuvelen, D.T. Brookes & E. Etkina "Using Observation and Concept Testing Video Experiments in Introductory Physics," AAPT National Meeting, Philadelphia, January 19-23, 2002 [talk].
E. Etkina & D.T. Brookes, "Experiments at Home: Real-Time Video Data on the Web," AAPT National Meeting, Philadelphia, January 19-23, 2002 [talk].

Workshops

"Learn physics while practicing science: Introduction to ISLE" (with E. Etkina, G. Planinsic, & Y. Lin) – Workshop at the 2019 AAPT Summer meeting, Provo, UT, July 2019.
"Learn physics while practicing science: Introduction to ISLE" (with E. Etkina & Y. Lin) – Workshop at the 2018 AAPT Summer meeting, Washington, DC, July 2018.
"Learn physics while practicing science: Introduction to ISLE" – 5-day workshop at Syiah Kuala University, Banda Aceh, Indonesia, July 2018.
"Learning physics while practicing science: Introduction to ISLE" (with Y. Lin & R. Zisk) – Workshop at the 2017 AAPT Summer meeting, Cincinnati, OH, July 2017.
"Learning physics while practicing science: Introduction to ISLE" (with E. Etkina & G. Planinsic) – Workshop at the 2016 AAPT Summer meeting, Sacramento, CA, July 2016.
"Learning physics while practicing science: Introduction to ISLE" (with E. Etkina & G. Planinsic) – Workshop at the 2015 AAPT Summer meeting, College Park, MD, July 2015.
"Learning physics while practicing science" (with E. Etkina) – Workshop at the AAPT Summer meeting, Minneapolis, Minnesota, July 2014.
"Learning physics while practicing science" (with E. Ektina & A. Van Heuvelen) – Workshop at the AAPT Summer meeting, Portland, Oregon, July 2013.

"Learn Physics while practicing science" (with E. Ektina & A. Van Heuvelen) – Workshop at the AAPT Summer meeting, Philadelphia, PA, July, 2012.
"Learning physics while practicing science" (with E. Ektina & A. Van Heuvelen) – Workshop at the National AAPT Summer Meeting, Omaha, Nebraska, July 2011.
"Learn physics while practicing the processes of science" (with Y. Lin) – Workshop at the Florida section of the AAPT Meeting, Miami, FL, April 1-2, 2011.
"Learn physics while practicing the processes of science" – Workshop at Western Kentucky University, March 15, 2011.
"Learn physics while practicing science" (with E. Ektina & A. Van Heuvelen) – Workshop at the 2010 AAPT Summer meeting, Portland, Oregon, July 2010.
"Learn physics while practicing the processes of science" (with E. Etkina & A. Van Heuvelen) 1 – day workshop at the AAPT National Meeting, Greensboro, NC, July 29 - August 1, 2007.
"Learn physics while practicing the processes of science" (with E. Etkina & A. Van Heuvelen) 1 – day workshop at the 2006 AAPT Summer Meeting, Syracuse, NY, July 22nd, 2006.
"Doing Science with Minimal Resources" – Workshop for rural in-service science teachers, Ladysmith, South Africa, June 2004.
"Use Technology and Processes of Science to Enhance Student Learning and Confidence" (with E. Etkina & A. Van. Heuvelen) – Workshop at the AAPT National Meeting, Miami, January 24-28, 2004.

Teaching Activities

Courses taught

2016-present at CSU, Chico:

Instructor and administrator of PHYS 202A & PHYS 202B, General Physics (discussion and lab).
Instructor and administrator of PHYS 204A, Mechanics (discussion and lab).
Instructor and administrator of PHYS 341, Advanced Inquiry into Physics.
Instructor and administrator of PHYS 435A and PHYS 435B, Quantum mechanics I & II (discussion)

2015-2016:

Instructor and administrator of PHYS 202A & PHYS 202B, General Physics (discussion and lab) at CSU Chico. Instructor and administrator of PHYS 341, Advanced Inquiry into Physics.

2009-2015:

Instructor and administrator of a 30-75 student, calculus-based physics course at Florida International University: Physics 2048 & 2049. This course implemented the ISLE (Investigative Science Learning Environment) curriculum in a studio setting where there were no formal lectures.

2005 - 2006:

Lecturer and administrator of a large enrollment (200 students), algebra-based physics course at Rutgers university: Physics 193 & 194, "Physics for the Sciences." This course implemented the ISLE (Investigative Science Learning Environment) curriculum.

1995 - 2005:

Teaching Assistant at the University of Cape Town, Brandeis University, and Rutgers University. Taught in introductory calculus and algebra-based physics courses. Taught lab sections and recitation sections, both traditional and reformed (ISLE) formats.

January - June 1999:

Lectured intermediate quantum mechanics course (Griffiths level) for approximately 15 undergraduate physics majors at the University of the Western Cape.

1995 - 1996:
Co-authored introductory 1st year lab manual for physics majors at University of Cape Town. Implemented reformed 1st year physics lab, based on developed curriculum materials.

Curricular Development - Courses and Programs Developed

2001-2010 Developed a website (together with E. Etkina) videos.islephysics.net for pre-service, in-service physics teachers, physics university faculty and elementary science teachers. The page contains over 200 real time digitized video experiments and curriculum materials supporting them (questions and problems). These experiments can be used for data analysis in a physics course of any level (from elementary to physics graduate school). The site received AAAS award for the Best Technology Resource in 2010.
2009 – 2015 Developed and refined the first studio-based implementation of the Investigative Science Learning environment (ISLE) for the calculus-based introductory physics sequence.

Memberships

American Association of Physics Teachers

Service

Contributions to the Advancement of the Academic Profession

Reviewer: American Journal of Physics; European Journal of Physics, Journal of Chemical Education; Journal of Research in Science Teaching; Journal of the Learning Sciences, Journal of the Southern African Association for Research in Mathematics, Science and Technology Education; International Journal of Science Education, Physical Review: Physics Education Research

Conferences organized: Co-Organizer, Physics Education Research Conference 2011: Frontiers in Assessment: Instrumentation, Goals & Practices, August 3 – 4, 2011, Omaha, NE.

Service to California State University, Chico

Sept. 2016 – 2017: Organizer and coordinator of the STEM Pedagogy Faculty Learning Community in the College of Natural Sciences.
Nov. 2016 – 2017: Member of the (department level) new science building committee

Service to Florida International University

2014 – 2015 Chair of the Introductory physics committee
2013 – 2015 Chair of the textbook committee
2010 – 2015 Member of Undergraduate committee
2009 – 2014 Member of the college curriculum committee

Students Supervised

Past doctoral students

Co-major advisor – Binod Nainabasti (Ph.D., physics education research), started 2012, defended Oct. 2016.
Co-major advisor – Geraldine Cochran (Ph.D. science education) started 2010, defended Dec. 2013.
Committee member – Idyakis Rodriguez (Ph.D. physics education research)

Committee member – Vashti Sawtelle (Ph.D. physics education research)

Undergraduate students

@CSU, Chico: Tori Goff (2016), Victoria Matthews, Jose Robles, Kirk Williams, Robert Keen (2017)
@ FIU: Alexander Moncion, Celestena Williams, Maria Manrique

Honors and Awards

2010 – *Science* Prize for Online Resources in Education (SPORE). Awarded October 29, 2010. See http://www.sciencemag.org/feature/data/prizes/spore/