Curriculum Vitae

Marcos D. Caballero

Department of Physics and Astronomy,
Department of Computational
Mathematics, Science, and Engineering, &
CREATE for STEM Institute

Michigan State University

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Contents

1.1   Contact Information

Department of Physics & Astronomy
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Family: Partner (Jamie), Daughters (Juniper - 10, Evelyn - 8, Olivia - 5)

1.2   Education

- Georgia Institute of Technology (Atlanta, GA) Doctor of Philosophy in Physics, 2011
  Thesis: **Evaluating and Extending a Novel Course Reform of Introductory Mechanics**
  Advisor: Prof. Michael F. Schatz [Online]
- Georgia Institute of Technology (Atlanta, GA) Master of Science in Physics, 2007
- University of Texas at Austin (Austin, TX) Bachelor of Science in Physics, 2004

1.3   Academic Experience

Positions
- 2020 – Present, Associate Professor, Department of Computational Mathematics, Science, and Engineering
- 2018 – Present, Lappan-Phillips Associate Professor of Physics Education, Department of Physics and Astronomy, Michigan State University
- 2017 – Present, Adjunct Associate Professor, Department of Physics, University of Oslo
- 2013 – 2018, Assistant Professor, Department of Physics and Astronomy, Michigan State University
- 2013 – Present, Leadership Faculty, CREATE for STEM Institute, Michigan State University
- 2011 – 2013, Postdoctoral Researcher, Department of Physics, University of Colorado Boulder
- 2011 – 2013, Research Affiliate, School of Physics, Georgia Institute of Technology
- 2005 – 2011, Graduate Teaching and Research Assistant, School of Physics, Georgia Institute of Technology

Awards and Honors
- 2022 Department Award for Improving Undergraduate Physics Education, Team Member, American Physical Society [Press]
- 2021 Physical Review PER Editor's Suggestion (Topic: Quantitative Methods for Education Research): *Framework for evaluating statistical models in physics education research* [Paper]
- 2021 Physical Review PER Editor's Suggestion (Topic: Graduate Physics Education): *Physics Graduate Record Exam does not help applicants "stand out"* [Paper]
- 2019 Physical Review PER Editor's Suggestion (Topic: Computational Physics Education): *Physics computational literacy: An exploratory case study using computational essays* [Paper]

- 2019 Physics Education Research Conference Notable Paper [Press]
- 2019 Featured in MSU Today for Teaching Innovation [Press]
- 2018 President's Distinguished Teaching Award, MSU [Press]
- 2018 Teacher-Scholar Award, MSU [Press]
- 2017 Featured in MSU Today for NSF grant [Press]
- 2016 Physics Education Research Conference Notable Paper [Press]
- 2016 College of Natural Science Teaching Prize, MSU
- 2015 Thomas H. Osgood Memorial Awards for Faculty Excellence in Teaching, MSU
- 2014 STEM Gateway Fellow, College of Natural Science, MSU
- 2011 Tower Award, Georgia Institute of Technology
- 2010 CETL/BP Outstanding Graduate TA Award Finalist, Georgia Institute of Technology
- 2009 CETL/BP Outstanding Graduate TA Award, Georgia Institute of Technology
- 2007 - 2008 Teaching Assistant of the Year, American Association of Physics Teachers
- 2007 - 2011 Gozuieta Fellow, Georgia Institute of Technology
- 2007 Travel Grant, Technical University of Denmark
- 2006 Tower Award, Georgia Institute of Technology

1.4   Supervised Personnel

Supervised Research Associates

15. Paul Hamerski (Computational Science, w./ D. Silvia & B. O'Shea), August 2021 –
14. Rachel Frisbie (Computational Science, w./ D. Silvia & B. O'Shea), October 2020 –
13. Thomas Finzell (Computational Science, w./ D. Silvia & B. O'Shea), August 2020 –
12. Paul Bergeron (Physics, w./ M. Cooper), August 2019 –
11. Tor Odden (Physics), February 2018 – August 2021 (Associate Professor, Physics, University of Oslo)
10. Dan Weller (Physics, w./ P. Irving), August 2018 – May 2021 (Lecturer, Saginaw Valley State University)
 9. Rachel Henderson (Physics), April 2018 – August 2020 (Assistant Professor, Michigan State University)
 8. Nathaniel Hawkins (Computational Science), Fall 2018 – Fall 2019 (PhD Student; CMSE, Michigan State University)
 7. Daryl McPadden (Physics, w/ P. Irving), April 2017 – May 2019 (Assistant Professor, Michigan State University)
 6. John M. Aiken (Physics), August 2016 – August 2017 (PhD Student, University of Oslo)
 5. William Martinez (Physics), August 2015 – August 2017 (Staff Engineer, VINSE - Nanoscale Science and Engineering, Vanderbilt University)
 4. Paul W. Irving (Physics), May 2014 – August 2016 (Assistant Professor, Michigan State University)
 3. Leanne Doughty (Physics), January 2014 – January 2016 (Assistant Teaching Professor, Georgetown University)
 2. James T. Laverty (Physics), August 2013 – August 2016 (Assistant Professor of Physics, Kansas State University)
 1. Steven F. Wolf (Physics), August 2013 – August 2014 (Assistant Professor of Physics, Eastern Carolina University)

Graduate Students (Main Supervisor)

 7. Emily Bolger (MSU, Computational Science, 2021 –)
 6. Nicholas Young (MSU, Physics, 2017 – 2021) - PhD earned Summer 2021; Postdoctoral Fellow, University of Michigan
 5. Sebastian Winther-Larsen (UiO, Physics, 2019 – 2021) - Left UiO to join startup
 4. Alyssa Waterson (MSU, Physics, 2019 – 2020) - Supervised by R. Henderson
 3. John Aiken (UiO, Physics, 2017 – 2020) - PhD earned Fall 2020; Postdoctoral Fellow, University of

Oslo
2. Michael Obsniuk (MSU, Physics, 2013 – 2020) - PhD earned Spring 2020; Instructor, Kettering University
1. Alanna Pawlak (MSU, Physics, 2013 – 2018) - PhD earned Summer 2018; Assistant Teaching Professor - University of Washington Bothell

Graduate Students (Co-supervisor)

5. Rachel Roca (MSU, Computational Science, 2021 – w/ Asst. Prof. Elizabeth Munch)
4. Odd Petter Sand (UiO, Physics and Mathematics, w. Elise Lockwood, 2017 – 2021) - PhD earned Fall 2021; IT Professional, University of Oslo
3. Kelsey Funkhouser (2015 – 2019, Physics, w/ Asst. Prof. Vashti Sawtelle) - PhD earned Summer 2019, Postdoctoral fellow at CU-Denver
2. John Aiken (Georgia State, Physics, Master's Thesis, 2013)
1. Robert Solli (UiO, Physics, Master's Student, 2018 – 2019)

PhD students on temporary projects (summer etc)

2. Thomas Finzell (FAST Fellowship, 2013 – 2014)
1. Adam Fritsch (FAST Fellowship, 2013 – 2014)

Collaborating PhD students (Other Departments)

4. Sungwhan Byun (Teacher Education, 2019 – 2021) - PhD earned 2021, Assistant Professor at North Carolina State
3. Julie Christensen (Teacher Education, 2018 –)
2. May Lee (Teacher Education, 2013 – 2017)
1. James Brian Hancock II (Teacher Education, 2013 – 2014)

Undergraduate Students supervised on research

38. Thao Nguyen (Spring 2021 –)
37. Julia Willison (Summer 2020 –)
36. Le Nguyen (Fall 2020 – Summer 2021)
35. Dao Lam (Spring 2021 – Summer 2021)
34. Nicole Verbencoeur (Spring 2020 – Summer 2021)
33. Trevor Franklin (Fall 2018 – Fall 2020)
32. River Ward (Fall 2018 – Fall 2020)
31. Tabitha Hudson (Spring 2020 – Summer 2020)
30. Matt Ring (Spring 2018 – Summer 2020)
29. Alex Voetberg (Fall 2018 – Spring 2019)
28. Xu Zhen (Machine Learning REU, UiO, Summer 2019)
27. Zhang Linrui (Machine Learning REU, UiO, Summer 2019)
26. Lucas Charpentier (Machine Learning REU, UiO, Summer 2019)
25. Fu-Anne Wang (Machine Learning REU, UiO, Summer 2019)
24. Gabriel Sigurd Cabrera (Machine Learning REU, UiO, Summer 2019)
23. Nils Johannes Mikkelsen (Machine Learning REU, UiO, Summer 2019)
22. Joseph Wilson (Machine Learning REU, UiO, Summer 2019)
21. Daniel Oleynik (Fall 2016 – Summer 2019)
20. Carissa Myers (REU - Wright State University, w/ V. Sawtelle, Summer 2018)
19. Alyssa Waterson (Fall 2016 – Summer 2019)
18. Kristy Griswold (Spring 2016 – Fall 2018)
17. Ashleigh Leary (Fall 2016 – Fall 2018)
16. Grant Allen (Summer 2017 – Fall 2017)

15. Nathaniel Hawkins (Fall 2015 – Fall 2017)
14. Joseph Seitz (Summer 2017)
13. Anthony Renzaglia (Summer 2017)
12. Justin Gambrell (Summer 2017)
11. Michael Zwartz (REU - Lewis University, Summer 2017)
10. Anna Turnbull (MSU, Fall 2014 - Spring 2017)
 9. Sarah Boyer (REU - Spring Arbor University, Summer 2016)
 8. Paul Hamerksi (REU - Carnegie Mellon University, Summer 2015)
 7. Laura Hunter (REU - Mt. Holyoke College, Summer 2015)
 6. Sonny Ly (MSU, Spring 2014 – Spring 2015)
 5. Claire Morrison (MSU, Fall 2013 – Spring 2015)
 4. Keenan Noyes (MSU, Fall 2013 – Spring 2015)
 3. Zach Nusbaum (MSU, Fall 2013 – Spring 2015)
 2. Brandon Ewert (MSU, Spring 2014)
 1. Max Smith (MSU, Fall 2013 – Spring 2014)

Undergraduate Students supervised on teaching

13. Amanda Bowerman (Fall 2020)
12. Jack Haas (Fall 2020)
11. Madelyn Klinkoski (Fall 2015)
10. Brandon Bilinski (Fall 2015)
 9. Lauren Constantini (Fall 2015)
 8. Brandon Roek (Fall 2015)
 7. Ashley O'Brien (Fall 2015)
 6. Steven Collareno (Spring 2015, Fall 2015)
 5. Katherine Wampler (Spring 2015, Fall 2015)
 4. Melissa Buchelli (Spring 2015)
 3. Tyler Hoffman (Spring 2015)
 2. Karen Davidge (Spring 2014, Spring 2015)
 1. Stephanie Schmidt (Spring 2015)

Google Scholar (updated: February 19, 2022)

	All	Since 2017
Citations	1242	984
h-index	18	17
i10-index	27	23
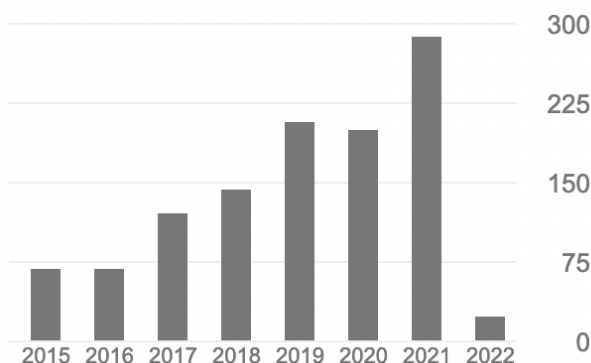
2.1 Invited papers and book chapters

4. Tor Ole Odden and Marcos D. Caballero. Physics Computational Literacy: What, Why, and How? In M. Faith Tasar and Paula Heron, editors, *International Handbook of Physics Education Research*. American Institute of Physics, 2022, (in editorial review)

3. Alexis V. Knaub, John M. Aiken, and Marcos D. Caballero. Editorial: Focused Collection: Quantitative Methods in PER: A Critical Examination. *Phys. Rev. Phys. Educ. Res.*, 15:020001, Jul 2019

2. Marcos D. Caballero and Morten Hjorth-Jensen. Integrating a computational perspective in physics courses. In *New Trends in Physics Education Research*. Nova Science Publishers, 2018

1. Marcos D. Caballero. Taking A Scientific Approach To Physics Education. *Student Journal of Physics*, 6(1), 2017

2.2 Popular Press

2. Marcos D. Caballero, Larry Engelhardt, Robert Hilborn, Marié Lopez del Puerto, and Kelly Roos. PICUP: The Partnership for the Integration of Computation into Undergraduate Physics. *APS News*, 28(3), 2019

1. Marcos D. Caballero, Dimitri R. Dounas-Frazer, Heather J. Lewandowski, and MacKenzie R. Stetzer. Labs are Necessary, and We Need to Invest in Them. *APS News*, 27(5), 2018

2.3   Articles in review

6. Nicholas T Young, N Verboncoeur, Dao Chi Lam, and Marcos D Caballero. Rubric-based holistic review represents a change from traditional graduate admissions approaches in physics. *Phys. Rev. Phys. Educ. Res.*, 2022 (in review)

5. Nicholas T Young, K Tollefson, Remco GT Zegers, and Marcos D Caballero. Rubric-based holistic review: a promising route to equitable graduate admissions in physics. *Phys. Rev. Phys. Educ. Res.*, 2022 (in review)

4. Joseph Wilson, Benjamin Pollard, John M. Aiken, Marcos D. Caballero, and H. J. Lewandowski. Classification of open-ended responses to a research-based assessment using natural language processing. *Phys. Rev. Phys. Educ. Res.*, 2022 (in review)

3. Daniel Weller, Theodore Bott, Marcos D. Caballero, and Paul W. Irving. Developing a learning goal framework for computational thinkingin computationally integrated physics classrooms. *Phys. Rev. Phys. Educ. Res.*, 2022 (in review)

2. Odd Petter Sand, Marcos D. Caballero, Knut Martin Mørken, and Elise Lockwood. Students' Development of a Logarithm Function in Python Using Taylor Expansions: A Teaching Design Case Study. *Digital Experiences in Mathematics Education*, 2022 (in review)

1. Odd Petter Sand, Marcos D. Caballero, Knut Martin Mørken, and Elise Lockwood. Three Cases That Demonstrate How Students Connect the Domains of Mathematics and Computing. *Journal of Mathematical Behavior*, 2022 (accepted)

2.4   Articles appearing in peer-reviewed journals

38. Benjamin Pollard, Robert Hobbs, Rachel Henderson, Marcos D. Caballero, and H. J. Lewandowski. Introductory physics lab instructors' perspectives on measurement uncertainty. *Phys. Rev. Phys. Educ. Res.*, 17:010133, May 2021

37. Nicholas T Young and Marcos D Caballero. Predictive and Explanatory Models Might Miss Informative Features in Educational Data. *Journal of Educational Data Mining*, 13(4):31–86, 2021

36. Editor's Suggestion –   Nicholas T. Young and Marcos D. Caballero. Physics Graduate Record Exam does not help applicants "stand out". *Phys. Rev. Phys. Educ. Res.*, 17:010144, Jun 2021

35. Editor's Suggestion –   John M. Aiken, Riccardo De Bin, H. J. Lewandowski, and Marcos D. Caballero. Framework for evaluating statistical models in physics education research. *Phys. Rev. Phys. Educ. Res.*, 17:020104, Jul 2021

34. Nils J. Mikkelsen, Nicholas T. Young, and Marcos D. Caballero. Investigating institutional influence on graduate program admissions by modeling physics graduate record examination cutoff scores. *Phys. Rev. Phys. Educ. Res.*, 17:010109, Feb 2021

33. John M. Aiken, Riccardo De Bin, Morten Hjorth-Jensen, and Marcos D. Caballero. Predicting time to graduation at a large enrollment american university. *PLOS ONE*, 15(11):1–28, 11 2020

32. Paul W. Irving, Daryl McPadden, and Marcos D. Caballero. Communities of practice as a curriculum design theory in an introductory physics class for engineers. *Phys. Rev. Phys. Educ. Res.*, 16:020143, Dec 2020

31. Editor's Suggestion –   Tor Ole B. Odden, Alessandro Marin, and Marcos D. Caballero. Thematic analysis of 18 years of physics education research conference proceedings using natural language processing. *Phys. Rev. Phys. Educ. Res.*, 16:010142, Jun 2020

30. Alanna Pawlak, Paul W. Irving, and Marcos D. Caballero. Learning assistant approaches to teaching computational physics problems in a problem-based learning course. *Phys. Rev. Phys. Educ. Res.*, 16:010139, Jun 2020

29. Kinsey Bain, Rebecca L. Matz, Cori L. Fata-Hartley, Marcos D. Caballero, Diane Ebert-May, Sonia M. Underwood, Justin H. Carmel, Deborah G. Herrington, James T. Laverty, Erin M. Duffy, Jon R. Stoltzfus, Lydia Bender, Lynmarie A. Posey, Mark Urban-Lurain, Ryan L. Stowe, Ryan D. Sweeder, Stuart H. Tessmer, and Melanie M. Cooper. Characterizing College Science Instruction: The Three-Dimensional Learning Observation Protocol. *PLoS One*, 15(6):e0234640, 2020

28. Tor Ole B. Odden, Elise Lockwood, and Marcos D. Caballero. Physics computational literacy: An exploratory case study using computational essays. *Phys. Rev. Phys. Educ. Res.*, 15:020152, Dec 2019

27. Kelsey Funkhouser, William Martinez, Rachel Henderson, and Marcos D. Caballero. Design, Analysis, Tools, and Apprenticeship (DATA) Lab. *Eur. J. Phys.*, 40(6):065701, 2019

26. Marcos D. Caballero, Norman Chonacky, Larry Engelhardt, Robert C. Hilborn, Marie Lopez del Puerto, and Kelly R. Roos. Picup: A community of teachers integrating computation into undergraduate physics courses. *The Physics Teacher*, 57(6):397–399, 2019

25. John M. Aiken, Rachel Henderson, and Marcos D. Caballero. Modeling student pathways in a physics bachelor's degree program. *Physical Review Physics Education Research*, 15:010128, 2019

24. Nicholas T. Young, Grant Allen, John M. Aiken, Rachel Henderson, and Marcos D. Caballero. Using Random Forests to determine important features for integrating computation into physics courses. *Physical Review Physics Education Research*, 15:010114, 2019

23. Marcos D. Caballero and Laura Merner. Prevalence and nature of computational instruction in undergraduate physics programs across the united states. *Phys. Rev. Phys. Educ. Res.*, 14:020129, Dec 2018

22. Rebecca L. Matz, Cori L. Fata-Hartley, Lynmarie A. Posey, James T. Laverty, Sonia M. Underwood, Justin H. Carmel, Deborah G. Herrington, Ryan L. Stowe, Marcos D. Caballero, Diane Ebert-May, and Melanie M. Cooper. Evaluating the extent of a large-scale transformation in gateway science courses. *Science Advances*, 4(10), 2018

21. David Stroupe, Marcos D. Caballero, and Peter White. Fostering students' epistemic agency through the co-configuration of moth research. *Science Education*, pages 1–25, 2018

20. James T. Laverty and Marcos D. Caballero. Analysis of the most common concept inventories in physics: What are we assessing? *Phys. Rev. Phys. Educ. Res.*, 14:010123, Apr 2018

19. Alanna Pawlak, Paul W. Irving, and Marcos D. Caballero. Development of the modes of collaboration framework. *Phys. Rev. Phys. Educ. Res.*, 14:010101, Jan 2018

18. Paul W Irving, Michael J Obsniuk, and Marcos D Caballero. P3 : a practice focused learning environment. *European Journal of Physics*, 38(5):055701, 2017

17. Marcos D. Caballero, Leanne Doughty, Anna M. Turnbull, Rachel E. Pepper, and Steven J. Pollock. Assessing learning outcomes in middle-division classical mechanics: The colorado classical mechanics and math methods instrument. *Phys. Rev. Phys. Educ. Res.*, 13:010118, Apr 2017

16. James T Laverty, Sonia M Underwood, Rebecca L Matz, Lynmarie A Posey, Justin H Carmel, Marcos D Caballero, Cori L Fata-Hartley, Diane Ebert-May, Sarah E Jardeleza, and Melanie M Cooper. Characterizing college science assessments: the three-dimensional learning assessment protocol. *PloS one*, 11(9):e0162333, 2016

15. Melanie M. Cooper, Marcos D. Caballero, Diane Ebert-May, Cori L. Fata-Hartley, Sarah E. Jardeleza, Joseph S. Krajcik, James T. Laverty, Rebecca L. Matz, Lynmarie A. Posey, and Sonia M. Underwood. Challenge faculty to transform stem learning. *Science*, 350(6258):281–282, 2015

14. Stephanie V. Chasteen, Bethany Wilcox, Marcos D. Caballero, Katherine K. Perkins, Steven J. Pollock, and Carl E. Wieman. Educational transformation in upper-division physics: The science education initiative model, outcomes, and lessons learned. *Phys. Rev. ST Phys. Educ. Res.*, 11:020110, Sep 2015

13. Bethany R. Wilcox, Marcos D. Caballero, Charles Baily, Homeyra Sadaghiani, Stephanie V. Chasteen, Qing X. Ryan, and Steven J. Pollock. Development and uses of upper-division conceptual assessments. *Phys. Rev. ST Phys. Educ. Res.*, 11:020115, Sep 2015

12. Marcos D Caballero, Bethany R Wilcox, Leanne Doughty, and Steven J Pollock. Unpacking students' use of mathematics in upper-division physics: where do we go from here? *European Journal of Physics*, 36(6):065004, 2015

11. Lin Ding and Marcos D. Caballero. Uncovering the hidden meaning of cross-curriculum comparison results on the force concept inventory. *Phys. Rev. ST Phys. Educ. Res.*, 10:020125, Nov 2014

10. Anne-Marie Hoskinson, Brian A. Couch, Benjamin M. Zwickl, Kathleen A. Hinko, and Marcos D. Caballero. Bridging physics and biology teaching through modeling. *American Journal of Physics*, 82(5):434–441, 2014

9. Marcos D. Caballero and Steven J. Pollock. A model for incorporating computation without changing the course: An example from middle-division classical mechanics. *American Journal of Physics*, 82(3):231–237, 2014

8. Marcos D. Caballero, John B. Burk, John M. Aiken, Brian D. Thoms, Scott S. Douglas, Erin M. Scanlon, and Michael F. Schatz. Integrating numerical computation into the modeling instruction curriculum. *The Physics Teacher*, 52(1):38–42, 2014

7. Bethany R. Wilcox, Marcos D. Caballero, Daniel A. Rehn, and Steven J. Pollock. Analytic framework for students' use of mathematics in upper-division physics. *Phys. Rev. ST Phys. Educ. Res.*, 9:020119, Nov 2013

6. A.-M. Hoskinson, M. D. Caballero, and J. K. Knight. How can we improve problem solving in undergraduate biology?: Applying lessons from 30 years of physics education research. *CBE Life Sci Educ*, 12(2):153–161, 2013

5. Stephanie V. Chasteen, Rachel E. Pepper, Marcos D. Caballero, Steven J. Pollock, and Katherine K. Perkins. Colorado upper-division electrostatics diagnostic: A conceptual assessment for the junior level. *Phys. Rev. ST Phys. Educ. Res.*, 8:020108, Sep 2012

4. Marcos D. Caballero, Matthew A. Kohlmyer, and Michael F. Schatz. Implementing and assessing computational modeling in introductory mechanics. *Phys. Rev. ST Phys. Educ. Res.*, 8:020106, Aug 2012

3. Marcos D. Caballero, Edwin F. Greco, Eric R. Murray, Keith R. Bujak, M. Jackson Marr, Richard Catrambone, Matthew A. Kohlmyer, and Michael F. Schatz. Comparing large lecture mechanics curricula using the force concept inventory: A five thousand student study. *American Journal of Physics*, 80(7):638–644, 2012

2. Matthew A. Kohlmyer, Marcos D. Caballero, Richard Catrambone, Ruth W. Chabay, Lin Ding, Mark P. Haugan, M. Jackson Marr, Bruce A. Sherwood, and Michael F. Schatz. Tale of two curricula: The performance of 2000 students in introductory electromagnetism. *Phys. Rev. ST Phys. Educ. Res.*, 5:020105, Oct 2009

1. A.L. Cochran, E.S. Barker, M.D. Caballero, and J. GyÃ¶rgey-Ries. Placing the deep impact mission into context: Two decades of observations of 9p/tempel 1 from mcdonald observatory. *Icarus*, 199(1):119 – 128, 2009

2.5 Articles appearing in peer-reviewed conference proceedings

32. Rachel Henderson, Kelsey Funkhouser, and Marcos D. Caballero. A Longitudinal Exploration of Students' Beliefs about Experimental Physics. In *Proceedings of the 2019 Physics Education Research Conference*, 2020

31. Nicholas T. Young and Marcos D. Caballero. Using Machine Learning to Understand Physics Graduate School Admissions. In *Proceedings of the 2019 Physics Education Research Conference*, 2020

30. Tor Ole Odden and Marcos D. Caballero. Computational Essays and Computational Literacy at the University of Oslo. In *Proceedings of the 2019 Physics Education Research Conference*, 2020

29. Daniel Weller, Marcos D. Caballero, and Paul W. Irving. Investigating Teacher Learning Goals Involving Computation in High School Physics. In *Proceedings of the 2019 Physics Education Research Conference*, 2020

28. Theodore Bott, Daniel Weller, Marcos D. Caballero, and Paul W. Irving. Preliminary Analysis of Student-Identified Themes around Computation in High School Physics. In *Proceedings of the 2019 Physics Education Research Conference*, 2020

27. Jacqueline Bumler, Paul C. Hamerski, Marcos D. Caballero, and Paul W. Irving. How do previous coding experiences influence undergraduate physics students? In *Proceedings of the 2019 Physics Education Research Conference*, 2020

26. Daryl McPadden, Paul Hamerski, Marcos D. Caballero, and Paul W. Irving. Feedback as a mechanism for improving students scientific communication skills. In *Proceedings of the 2018 Physics Education Research Conference*, 2018

25. Odd Petter Sand, Tor O.B. Odden, Christine Lindstrøm, and Marcos D. Caballero. How computation can facilitate sensemaking about physics: A case study. In *Proceedings of the 2018 Physics Education Research Conference*, 2018

24. Kelsey Funkhouser, Marcos D. Caballero, Paul W. Irving, and Vashti Sawtelle. What counts in labora-

tories: toward a practice-based identity survey. In *Proceedings of the 2018 Physics Education Research Conference*, 2018

23. Ashleigh Leary, Paul W. Irving, and Marcos D. Caballero. The difficulties associated with integrating computation into undergraduate physics. In *Proceedings of the 2018 Physics Education Research Conference*, 2018

22. Kristina Griswold, Daryl McPadden, Marcos D. Caballero, and Paul W. Irving. Denoting and comparing leadership attributes and behaviors in group work. In *Proceedings of the 2018 Physics Education Research Conference*, 2018

21. Robert Solli, John M. Aiken, Rachel Henderson, and Marcos D. Caballero. Examining the relationship between student performance and video interactions. In *Proceedings of the 2018 Physics Education Research Conference*, 2018

20. Paul W. Irving and Marcos D. Caballero. Expanding the picup community of practice. In *Proceedings of the 2017 Physics Education Research Conference*, pages 188–191, 2017

19. Nathaniel Hawkins, Michael J. Obsniuk, Paul W. Irving, and Marcos D. Caballero. Examining thematic variation in a phenomenographical study on computational physics. In *Proceedings of the 2017 Physics Education Research Conference*, pages 168–171, 2017

18. John M. Aiken and Marcos D. Caballero. Methods for analyzing pathways through a physics major. In *Proceedings of the 2016 Physics Education Research Conference*, pages 28–31, 2016

17. Marcos D. Caballero. Computation across the curriculum: What skills are needed? In *Proceedings of the 2015 Physics Education Research Conference*, pages 79–82, 2015

16. Paul W. Irving, Vashti Sawtelle, and Marcos D. Caballero. Troubleshooting formative feedback in p^3 (a group-based learning environment). In *Proceedings of the 2015 Physics Education Research Conference*, pages 155–158, 2015

15. James T. Laverty, Melanie M. Cooper, and Marcos D. Caballero. Developing the next generation of physics assessments. In *Proceedings of the 2015 Physics Education Research Conference*, pages 187–190, 2015

14. Alanna Pawlak, Paul W. Irving, and Marcos D. Caballero. Identification of a shared answer-making game in group context. In *Proceedings of the 2015 Physics Education Research Conference*, pages 255–258, 2015

13. Michael J. Obsniuk, Paul W. Irving, and Marcos D. Caballero. A case study: Novel group interactions through computational physics. In *Proceedings of the 2015 Physics Education Research Conference*, pages 239–242, 2015

12. Anna Turnbull, Leanne Doughty, Vashti Sawtelle, and Marcos D. Caballero. Student ideas around vector decomposition in the upper-division. In *Proceedings of the 2015 Physics Education Research Conference*, pages 239–242, 2015

11. Leanne Doughty and Marcos D. Caballero. Rubric design for separating the roles of open-ended assessments. In *Proceedings of the 2014 Physics Education Research Conference*, pages 71–74, 2014

10. James T. Laverty, Stuart H. Tessmer, Melanie M. Cooper, and Marcos D. Caballero. Engaging physics faculty in course transformation. In *Proceedings of the 2014 Physics Education Research Conference*, pages 147–150, 2014

9. Wolf. Stephen F., Leanne Doughty, Paul W. Irving, Eleanor C. Sayre, and Marcos D. Caballero. Just math: A new epistemic frame. In *Proceedings of the 2014 Physics Education Research Conference*, pages 275–278, 2014

8. John M. Aiken, Shih-Yin Lin, Scott S. Douglas, Edwin F. Greco, Brian D. Thoms, Marcos D. Caballero, and Michael F. Schatz. Student use of a single lecture video in a flipped introductory mechanics course. In *Proceedings of the 2014 Physics Education Research Conference*, pages 19–22, 2014

7. Scott S. Douglas, Shih-Yin Lin, John M. Aiken, Edwin F. Greco, Brian D. Thoms, Marcos D. Caballero, and Michael F. Schatz. Peer evaluation of video lab reports in a blended introductory physics course. In *Proceedings of the 2014 Physics Education Research Conference*, pages 75–78, 2014

6. Shih-Yin Lin, Scott S. Douglas, John M. Aiken, Edwin F. Greco, Brian D. Thoms, Marcos D. Caballero, and Michael F. Schatz. Peer evaluation of video lab reports in an introductory physics mooc. In *Proceedings of the 2014 Physics Education Research Conference*, pages 163–166, 2014

5. Marcos D. Caballero and Steven J. Pollock. Assessing student learning in middle-division classical mechanics/math methods. In *Proceedings of the 2013 Physics Education Research Conference*, pages

81–84, 2013

4. John M. Aiken, Shih-Yin Lin, Scott S. Douglas, Edwin F. Greco, Brian D. Thoms, Marcos D. Caballero, and Michael F. Schatz. The initial state of students taking an introductory physics mooc. In *Proceedings of the 2013 Physics Education Research Conference*, pages 53–56, 2013

3. Marcos D. Caballero, Bethany R. Wilcox, Rachel E. Pepper, and Steven J. Pollock. Acer: A framework on the use of mathematics in upper-division physics. In *Proceedings of the 2012 Physics Education Research Conference*, pages 90–93, 2012

2. Bethany R. Wilcox, Marcos D. Caballero, Rachel E. Pepper, and Steven J. Pollock. Upper-division student understanding of coulomb's law: Difficulties with continuous charge distributions. In *Proceedings of the 2012 Physics Education Research Conference*, pages 418–421, 2012

1. John M. Aiken, Marcos D. Caballero, Scott S. Douglas, John B. Burk, Erin M. Scanlon, Brian D. Thoms, and Michael F. Schatz. Understanding student computational thinking with computational modeling. In *Proceedings of the 2012 Physics Education Research Conference*, pages 46–49, 2012

2.6   Articles contributed to conference proceedings

2. Marcos D. Caballero, Matthew A. Kohlmyer, and Michael F. Fostering computational thinking. In *Proceedings of the 2011 Physics Education Research Conference*, pages 15–18, 2011

1. Keith R. Bujak, Marcos D. Caballero, Michael F. Schatz, M. Jackson Marr, and Richard Catrambone. Comparing the matter and interactions curriculum with a traditional physics curriculum: A think aloud study. In *Proceedings of the 2011 AERA Annual Meeting*, 2011

3.1   Summary

- Awarded $10.5M USD total as PI, Co-PI, or Senior Personnel at MSU and UiO
- Awarded $4.1M USD in external funding as PI or Co-PI at MSU

3.2   Under Review

3. Developing an evidence-based open-source introductory computational science curriculum, NSF, 08/01/21 - 7/31/26, $599,894, M.D. Caballero (PI), D. Silvia (Co-PI), B. O'Shea(Co-PI)
   Returned without review because of application cap. Appealing decision.
2. Developing a Computational Thinking Practices Curriculum Design Framework, NSF, 08/01/22 - 7/31/25, $599,228, P Irving (PI), D. McPadden (Co-PI), M.D. Caballero (Co-PI)
1. Collaborative Research: A Faculty Development Approach to Transforming Undergraduate Physics Education by Integrating and Assessing Computation, NSF, 08/01/21 - 7/31/26, $3,000,000 ($726,072 MSU Part), M.D. Caballero (PI)

3.3   Awarded

23. Research Experience for Undergraduates in Physics, NSF, 06/01/21 - 05/31/24, $469,267, S. Tessmer (PI), R. Zegers (Co-PI), M.D. Caballero (Co-PI), K. Cook (Co-PI)
22. Launching a Computational and Data Science Education Research effort at MSU, MSU CNS, 08/15/2019-08/14/2021, $140,000, B.W. O'Shea (PI), D. Silvia (PI), M.D. Caballero (PI)
21. Collaborative Research: Developing and implementing an assessment of measurement uncertainty, NSF IUSE, 09/01/2019-08/31/2022, $597,795 ($244,378, MSU part), M.D. Caballero (PI), H.J. Lewandowski (PI, CU-Boulder)
20. Laboratory Experiments for Students in Ghana, Michigan State University African Studies Center - Undergraduate Student Award, $2000, G. Moreau (PI), E. Brook (Co-PI), D. Mankel (Co-PI), M. Ring (Co-PI), M.D. Caballero (Faculty Advisor)
19. Laboratory Experiments for Students in Ghana, Michigan State University African Studies Center - Faculty Award, $4000, M.D. Caballero (PI)
18. International partnership for Computing in Science Education, Norwegian Research Council INT-PART, 4,500,000 NOK ($526,892), M. Hjorth-Jensen (PI), A. Malthe-Sørenson (Co-PI), M.D. Caballero (Co-PI)
17. Integrating Computation in Science Across the Michigan (Supplement), NSF STEM+C, 08/01/18-07/31/20, $117,000, M.D. Caballero (PI), P.W. Irving (Co-PI), D. Stroupe (Co-PI), N. Shah (Co-PI)
16. Collaborative Research: Conference on Integrating Computational Thinking with K-12 STEM Education, NSF DRK-12, $96,118 ($3,744 MSU part), Marcos Daniel Caballero (PI), Robert Hilborn (PI), Rebecca Vieyra (Co-PI), Colleen Megowan-Romanowicz (Co-PI)
15. Student-dreven forskning for bedre realfagsutdanning (Student-driven research for better science education), Thon Foundation, NOK 1,500,000 (USD $190,000), Marcos Daniel Caballero (Project leader), Anders Malthe-Sørenssen (Senior Personnel), Sunniva Rose (Senior Personnel)
14. Structured Assessment System for Improved Student Learning, NFR FinnUt, NOK 5,988,000 (USD $751,000), Anders Malthe-Sørenssen (Project leader), Morten Hjorth-Jensen (Project leader), Marcos Daniel Caballero (Senior Personnel), Knut Martin Mørken (Senior Personnel), Ellen Karoline Henriksen (Senior Personnel), Cathrine Wahlstrøm Tellefsen (Senior Personnel)
13. Collaborative Research: Extending A Coherent Gateway to STEM Teaching and Learning, NSF IUSE,

09/01/17 - 08/31/22, $1,323,499, M.M. Cooper (PI), Rebecca Matz (Co-PI), Marcos Daniel Caballero (Co-PI), Cori Fata-Hartley (Co-PI), Diane Ebert-May (Co-PI)

12. Integrating Computation in Science Across the Michigan, NSF STEM+C, 08/01/17-07/31/20, $1,245,351, M.D. Caballero (PI), P.W. Irving (Co-PI), D. Stroupe (Co-PI), N. Shah (Co-PI)

11. WebCAT, CREATE for STEM Seed Grant, 02/01/17-01/31/18, $5000 M.D. Caballero (PI), P.W. Irving (Co-PI)

10. Center for Computing in Science Education, National Research Council of Norway, 01/01/17 - 12/31/26, NOK 10,000,000 (USD $1,500,000) A. Malthe-Sørenssen (PI), Morten Hjorth-Jensen (Co-PI), Ellen Karoline Henriksen (Co-PI), Cathrine Wahlstrøm Tellefsen (Co-PI), Knut Mørken (Co-PI), M.D. Caballero (Research Lead)

9. Integrating Equitable Computational Science into High School Science Courses, Science and Society at State, 01/01/17 - 12/31/17, $10,000 D. Stroupe (PI), N. Shah (Co-PI), M.D. Caballero (Co-PI)

8. Research Experience for Undergraduates in Physics, NSF, 06/01/16 - 05/31/21, $652,201 S. Tessmer (PI), S. Pratt (Co-PI), M.D. Caballero (Co-PI), G. Westfall (Co-PI)

7. Learning Science by Doing Science: Project-based Learning through Urban Entomology, Science and Society at State, 01/01/16 - 12/31/16, $10,000 P. White (PI), D. Stroupe (Co-PI), M.D. Caballero (Co-PI)

6. Collaborative Research: Integrating Computation into Undergraduate Physics: A Faculty Development Approach to Community Transformation, NSF, 09/01/15 - 08/31/19, $1,279,209 M.D. Caballero (PI, MSU), K. Roos (PI, Bradley), L. Engelhardt (PI, FMU), M. Lopez (PI, St. Thomas), R. Hilborn (PI, AAPT)

5. Collaborative Research: Fostering integration of computational methods in physics courses: A local communities approach, NSF, 07/01/15 - 06/30/18 $219,136 M.D. Caballero (PI, MSU), N. Chonacky (PI, Yale), M. Lopez (PI, St. Thomas), R. Hilborn (PI, AAPT)

4. Collaborative Research: Surveying the state of computational physics in courses for physics majors, NSF, 01/01/15 - 12/31/18, $126,320; 21,380 (MSU Part) M.D. Caballero (PI, MSU), N. Chonacky (PI, Yale), R. Hilborn (PI, AAPT)

3. LEVERS: Leveraging Engagement and Vision to Encourage Retention in STEM, HHMI, 09/01/14 - 08/31/19, $1,500,000 S. Chivukula (PI), M.D. Caballero (Co-author & Physics Project Lead)

2. Transforming experiences for science and engineering students: Integrating scientific practices into introductory calculus-based mechanics, LPF-CMP 2, 01/01/14 - 12/31/15, $200,000 M.D. Caballero (PI, MSU), D. Stroupe (Co-PI), S. Tessmer (Co-PI)

1. InvestigAction: Underrepresented Middle School Youth Becoming Community Engineering Experts, LPF-CMP 2, 01/01/14 - 05/01/15, $125,000 A. Calabrese-Barton (PI), S. Calabrese-Barton (Co-PI), M.D. Caballero (Co-PI), B. Geier (Co-PI)

4.1 Conference Invited Talks

23. PICUP Capstone Conference, Virtual Conference due to COVID-19, August 2021
22. American Association of Physics Teachers Summer Meeting, Virtual Conference due to COVID-19, July 2021
21. American Association of Physics Teachers Summer Meeting, Virtual Conference due to COVID-19, July 2020
20. American Association of Physics Teachers Summer Meeting, Provo, UT, July 2019
19. APS April Meeting, Denver, CO, Apr 2019
18. Michigan Science Teacher's Association, Grand Rapids, MI, Mar 2019
17. JupyterCon, New York, NY, Aug 2018
16. Michigan Science Teacher's Association, Lansing, MI, Mar 2018
15. American Association for the Advancement of Science Meeting, Austin, TX, Feb 2018
14. North Carolina section of the American Association of Physics Teachers, Meeting, Greenville, NC, Oct 2017
13. American Association of Physics Teachers Summer Meeting, Cincinnati, Oh, July 2017
12. Transforming Research in Undergraduate STEM Education, St. Paul, MN, July 2017
11. Ohio Section of the American Physical Society Meeting, Ypsilanti, MI, May 2017
10. American Association of Physics Teachers Winter Meeting, Atlanta, GA, Feb 2016
9. SIAM Conference on Applied Mathematics Education, Philadelphia, PA, Oct 2016
8. American Association of Physics Teachers Summer Meeting, Sacramento, CA, Jul 2016
7. APS Division of Atomic, Molecular, and Optical Physics Meeting, Providence, RI, May 2016
6. American Association of Physics Teachers Winter Meeting, New Orleans, LA, Jan 2016
5. American Association of Physics Teachers Summer Meeting, College Park, MD, July 2015
4. American Association of Physics Teachers Winter Meeting, San Diego, CA, Jan 2015
3. American Association of Physics Teachers Summer Meeting, Minneapolis, MN, Jul 2014
2. American Association of Physics Teachers Winter Meeting, Orlando, FL, Jan 2014
1. American Association of Physics Teachers Winter Meeting, Ontario, CA, Feb 2012

4.2 Colloquium and Seminars

60. Departmental Colloquium, North Carolina State University, Raleigh, NC, Aug 2021
59. College Retreat, University College Dublin, College of Science, Virtual due to COVID-19, May 2021
58. Departmental Colloquium, University of Michigan Engineering Education Research, Virtual due to COVID-19, Jan 2021
57. Cal-Bridge Public Talk, Cal-Bridge Consortium, Virtual due to COVID-19, Nov 2020
56. Departmental Colloquium, Oregon State University, Virtual due to COVID-19, Oct 2020
55. NatSci Public Talk, Michigan State University, Virtual due to COVID-19, Aug 2020
54. Departmental Colloquium, University of Florida, Gainesville, FL, Feb 2020
53. Departmental Colloquium, Cornell University, Ithaca, NY, Oct 2019
52. Departmental Colloquium, University of Toledo, Toledo, OH, Oct 2019
51. Departmental Colloquium, University of Kansas, Lawrence, KS, Oct 2019
50. Departmental Colloquium, Texas A&M Commerce, Commerce, TX, Sep 2019
49. Departmental Colloquium, Tufts University, Boston, MA, Apr 2019
48. Physics Research Seminar, Boston University, Boston, MA, Apr 2019
47. Biology Research Seminar, Boston University, Boston, MA, Apr 2019
46. Research Seminar, Yale University, New Haven, CT, Mar 2019
45. Research Seminar, University of Bridgeport, Bridgeport, CT, Mar 2019

44. Departmental Colloquium, University of Washington, Seattle, WA, Mar 2019
43. Research Seminar, University of Oslo, Oslo, Norway, Feb 2019
42. Research Seminar, University of Oslo, Oslo, Norway, Dec 2018
41. Departmental Colloquium, Texas Tech University, Lubbock, TX, Mar 2018
40. Departmental Colloquium, Cal Poly San Luis Obispo, San Luis Obispo, CA, Feb 2018
39. Departmental Colloquium, Kansas State University, Manhattan, KS, Nov 2017
38. Departmental Colloquium, Georgia State University, Atlanta, GA, Nov 2017
37. Departmental Colloquium, Western Michigan University, Kalamazoo, MI, Oct 2017
36. Research Seminar, Purdue University, West Lafayette, IN, Mar 2017
35. Departmental Colloquium, Amherst College, Amherst, MA, Feb 2017
34. Research Seminar, University of Michigan, Ann Arbor, MI, Dec 2016
33. Departmental Colloquium, Rochester Institute of Technology, Rochester, NY, Nov 2016
32. Research Seminar, University of Colorado Boulder, Boulder, CO, Nov 2016
31. Departmental Colloquium, Colorado School of Mines, Golden, CO, Nov 2016
30. Teaching Essentials Workshop (w/ M.M. Cooper, C. Fata-Hartley, and J. Carmel), Michigan State University - College of Natural Science, East Lansing, MI, Oct 2016
29. Departmental Colloquium, Texas State University, San Marcos, TX, Apr 2016
28. Departmental Colloquium, Central Michigan University, Mt. Pleasant, MI, Mar 2016
27. Departmental Colloquium, University of St. Thomas, St. Paul, MN, Feb 2016
26. Research Seminar, University of Michigan, Ann Arbor, MI, Nov 2015
25. Research Seminar, The Ohio State University, Columbus, OH, Apr 2015
24. Departmental Colloquium, Saginaw Valley State University, University Center, MI, Feb 2015
23. Teaching Essentials Workshop, Michigan State University - College of Natural Science, East Lansing, MI, Feb 2015
22. Research Seminar, Wayne State University, Detroit, MI, Jan 2015
21. Research Seminar, Michigan State University - Dept. of Physics and Astronomy, East Lansing, MI, Jan 2015
20. Research Seminar (w/ C. Schwarz and T. Long), Michigan State University - CREATE For STEM, East Lansing, MI, Nov 2014
19. Research Seminar (w/ V. Sawtelle), Michigan State University - Dept. of Physics and Astronomy, East Lansing, MI, Aug 2014
18. Research Seminar (w/ D. Stroupe), Michigan State University - CREATE For STEM, East Lansing, MI, Apr 2014
17. Departmental Colloquium, University of Maine, Orono, ME, Apr 2014
16. Research Seminar, Purdue University, West Lafayette, IN, Feb 2014
15. Departmental Colloquium, Indiana University Purdue University Indianapolis, Indianapolis, IN, Feb 2014
14. Research Seminar, American Natural History Museum, Dec 2013
13. Research Seminar, Global Physics Department, globalphysicsdept.org, Dec 2013
12. Keynote address, University of Edinburgh, Edinburgh, UK, May 2013
11. Research Seminar, University of Colorado Boulder, Boulder, CO, Apr 2013
10. Departmental Colloquium, University of Colorado Boulder, Boulder, CO, Mar 2013
9. Research Seminar, Michigan State University, East Lansing, MI, Mar 2013
8. Departmental Colloquium, Rochester Institute of Technology, Rochester, NY, Jan 2013
7. Research Seminar, Global Physics Department, globalphysicsdept.org, Sep 2012
6. Research Seminar, Global Physics Department, globalphysicsdept.org, Apr 2011
5. Departmental Colloquium, Georgia State University, Atlanta, GA, Apr 2011
4. Research Seminar, University of Colorado PER group, Boulder, CO, Mar 2011
3. Research Seminar, Massachusetts Institute of Technology RELATE group, Cambridge, MA, Feb 2011
2. Research Seminar, University of Minnesota PER group, Minneapolis, MN, Feb 2011
1. Departmental Colloquium, Spelman College, Atlanta, GA, Apr 2010

5.1 University Committees

Sabbatical - 2021-2022 Academic Year

- MSU, Dept. of Physics and Astronomy, Salary and Review AdHoc Committee, Spring 2021 – Fall 2021
- MSU, Dept. of Computational Mathematics, Science, and Engineering, Reappointment, Promotion, & Tenure Committee, Fall 2020 – Fall 2021
- MSU, College of Natural Science, Educational Technology Committee, Summer 2020 – Fall 2021
- MSU, Dept. of Physics and Astronomy, REU Committee, Spring 2016 – Fall 2021
- MSU, Dept. of Physics and Astronomy, Undergraduate Program committee, Fall 2013 – Fall 2021
- MSU, Dept. of Physics and Astronomy, Physics Education Research Search Committee, Chair, Fall 2019 – Spring 2020
- MSU, College of Natural Science, Mission and Vision Committee, Spring 2019 – Spring 2020
- MSU, Dept. of Physics and Astronomy, Graduate Program Committee, Fall 2018 – Spring 2020
- MSU, Dept. of Physics and Astronomy, Teaching Mentorship Committee, Fall 2018 – Spring 2020
- MSU, Dept. of Physics and Astronomy, Transforming Gateway Physics Courses Committee (chair), Fall 2018 – Spring 2020
- MSU, Dept. of Physics and Astronomy, Advisory Committee to the Chair, Fall 2018 – Spring 2020
- MSU, University Curriculum Committee, Fall 2016 – Spring 2018
- MSU, Dept. of Physics and Astronomy, Lyman-Briggs/PA Faculty Search Committee, Fall 2015 – Spring 2016
- MSU, Dept. of Physics and Astronomy, Algebra-based Physics Review committee, Spring 2014 – Spring 2016
- MSU, Dept. of Physics and Astronomy, Calculus-based Physics Review committee, Spring 2014 – Spring 2016
- MSU, Dept. of Physics and Astronomy, Instructor Search Committee, Fall 2014 – Spring 2015
- MSU, Dept. of Physics and Astronomy, Qualifying Exam committee, Fall 2013 – Spring 2014
- MSU, Dept. of Physics and Astronomy, Advising committees (other than own graduate students) for May Lee (Teacher Education)
- Thesis committee for John Aiken, Georgia State University, Atlanta, GA (Fall 2013)

5.2 National or International Advisory Committees other than Conferences

- Member, Standards for Physics Teachers, American Association of Physics Teachers, Spring 2021 –
- Past Chair, Group on Physics Education Research for the American Physical Society, Winter 2017 – Winter 2018
- Chair, Group on Physics Education Research for the American Physical Society, Winter 2016 – Winter 2017
- Vice-Chair, Group on Physics Education Research for the American Physical Society, Winter 2015 - Winter 2016
- Member, Research in Physics Education Committee for the American Associate of Physics Teachers, Winter 2015 - Winter 2018
- Chair of the Educational Technologies Committee for the American Association of Physics Teachers, Winter 2013-Winter 2014
- American Journal of Physics, Five Year Review Committee, 2012-2013
- Educational Technologies Committee for the American Association of Physics Teachers, Winter 2010-Winter 2014

5.3   Conference Planning and Advisory Committees

- Lawrence Technological Univesity, College of Science Advisory Board (2020 –)
- NSF Conference on Computational Thinking in Science Education (leadership team), College Park, MD (2019).
- Michigan AAPT/Ohio Section American Physical Society Spring Meeting, East Lansing, MI (2018).
- Michigan AAPT Section Spring Meeting, East Lansing, MI (2015).
- Physics Education Research Conference, Minneapolis, MN (2014).
- MSP Summer Science Academies Concepts in Physical Science (2011).
- Atlanta Metro Physics Teachers Network, Atlanta, GA (2011).
- Atlanta Metro Physics Teachers Network, Atlanta, GA (2010).
- MSP Summer Science Academies Concepts in Physical Science (2009).
- MSP Summer Science Academies Concepts in Physical Science (2008).

5.4   Editorships, Review Panels, Referee

- Reviewer, National Science Foundation, Division of Undergraduate Education, Spring 2021
- Guest Editor, Physical Review Physics Education Research, Quantitative Methods in PER: A Critical Examination, Summer 2017 – Spring 2019
- Reviewer, National Science Foundation, Division of Undergraduate Education, Summer 2016
- Referee:
    - Physical Review – Physics Education Research
    - American Journal of Physics
    - The Physics Teacher
    - Computers and Education
    - Journal of Engineering Education
    - Science Advances
    - PloS One
    - Artificial Intelligence Review
    - Physics Education Research Conference proceedings

5.5   Outreach Activities

- MSU/UiO Computational Physics Hack-A-Thon w/ M. Hjorth-Jensen (2019).
- MSU Department of Physics & Astronomy, Physics and Astronomy Day Coordinator w/ K. Hinko (2018).
- MSU Department of Physics & Astronomy, Physics and Astronomy Day Coordinator w/ K. Hinko and T. Finzell (2017).
- MSU Department of Physics & Astronomy, Physics Education Research Seminar coordinator (2014 – Present).
- MSU Department of Physics & Astronomy, Graduate Teaching Assistant Workshop coordinator (2014 – Present).
- Science Olympiad, Session coordinator, East Lansing, MI (2014 – 2016).
- Grandparent's University at MSU, Session coordinator, East Lansing, MI (2014).

5.6   Ph.D. Thesis Committee service

Not supervised/co-supervised students

14. Kathryn Bowen (MSU, Astronomy)
13. Vivian Breslin (MSU, Physics, Condensed Matter Experiment)
12. Julia Hinds (MSU, Physics, High Energy Experiment)
11. Justin Gambrell (Drexel University, Physics, Education)
10. Felix Ndayisabye (MSU, Physics, Nuclear Experiment)
 9. Laura Wood (MSU, Physics, Education)
 8. Brean Prefontaine (MSU, Physics, Education)
 7. Paul C. Hamerski (MSU, Physics, Education)
 6. Liangji Zhang (MSU, Physics, Condensed Matter Experiment)
 5. Kyle Krowpman (MSU, Physics, High Energy Experiment)
 4. Alex Madden (MSU, Physics, Condensed Matter Experiment)
 3. Forrest Phillips (MSU, Physics, High Energy Experiment; PhD 2019; now Staff Physicist at ARA)
 2. Christopher Minter (MSU, Chemistry, Education; PhD 2018; now lab coordinator at MSU)
 1. Thomas Finzell (MSU, Astronomy, Observational; PhD 2017; now postdoc at MSU)