

# Adrienne L. Traxler

adrienne.traxler@wright.edu

Department of Physics  
Wright State University  
Dayton, OH 45435

Office: 251 Fawcett Hall  
Phone: 937-985-3140

## Education

2006–2011	<b>PhD in Applied Mathematics and Statistics</b> , University of California Santa Cruz, Santa Cruz, CA.
2004–2006	<b>MS in Teaching (physics concentration)</b> , University of Maine, Orono, ME.
2000–2004	<b>BS in Physics</b> , University of Maine, Orono, ME.

## Professional Experience

2019–present	<b>Associate Professor of Physics</b> , Wright State University, Dayton, OH.
2014–2019	<b>Assistant Professor of Physics</b> , Wright State University, Dayton, OH.
2011–2014	<b>Assistant Director of Research Programs</b> , Department of Physics, Florida International University, Miami, FL.
March–July 2011	<b>Postdoctoral Researcher</b> , Department of Applied Mathematics and Statistics, University of California Santa Cruz, Santa Cruz, CA.

## Publications

### Journal Articles

2019	James Wells, Rachel Henderson, John Stewart, Gay Stewart, Jie Yang, and Adrienne Traxler. Exploring the structure of misconceptions in the Force Concept Inventory with modified module analysis. <i>Phys. Rev. Phys. Educ. Res.</i> , 15:020122, Sep 2019
	Jennifer Blue, Adrienne Traxler, and Geraldine Cochran. Resource letter: GP-1: Gender and physics. <i>American Journal of Physics</i> , 87(8):616, July 2019
	Rachel Henderson, John Stewart, and Adrienne Traxler. Partitioning the gender gap in physics conceptual inventories: Force Concept Inventory, Force and Motion Conceptual Evaluation, and Conceptual Survey of Electricity and Magnetism. <i>Phys. Rev. Phys. Educ. Res.</i> , 15(1):010131, May 2019
2018	Adrienne Traxler, A. Gavrin, and Rebecca Lindell. Networks identify productive forum discussions. <i>Phys. Rev. Phys. Educ. Res.</i> , 14(2):020107, September 2018

- Rachel Henderson, Paul Miller, John Stewart, Adrienne Traxler, and Rebecca Lindell. Item-level gender fairness in the Force and Motion Conceptual Evaluation and the Conceptual Survey of Electricity and Magnetism. *Phys. Rev. Phys. Educ. Res.*, 14(2):020103, July 2018
- Jennifer Blue, Adrienne L. Traxler, and Ximena C. Cid. Gender matters. *Physics Today*, 71(3):40–46, March 2018
- Adrienne Traxler, Rachel Henderson, John Stewart, Gay Stewart, Alexis Papak, and Rebecca Lindell. Gender fairness within the Force Concept Inventory. *Phys. Rev. Phys. Educ. Res.*, 14(1):010103, January 2018
- 2017 Rachel Henderson, Gay Stewart, John Stewart, Lynnette Michaluk, and Adrienne Traxler. Exploring the gender gap in the conceptual survey of electricity and magnetism. *Phys. Rev. Phys. Educ. Res.*, 13(2):020114, September 2017
- Noah L. Schroeder and Adrienne L. Traxler. Humanizing instructional videos in physics: When less is more. *Journal of Science Education and Technology*, 26(3):269–278, June 2017
- 2016 Adrienne L. Traxler, Ximena C. Cid, Jennifer Blue, and Ramón Barthelemy. Enriching gender in physics education research: A binary past and a complex future. *Phys. Rev. Phys. Educ. Res.*, 12(2):020114, August 2016
- 2015 Adrienne Traxler and Eric Brewster. Equity investigation of attitudinal shifts in introductory physics. *Phys. Rev. Spec. Top. - Phys. Educ. Res.*, 11(2):020132, November 2015
- 2014 Isis Artze-Vega, Leslie Richardson, and Adrienne Traxler. Stereotype threat-based diversity programming: Helping students while empowering and respecting faculty. *To Improve the Academy*, 33(1):74–93, September 2014
- 2013 Eric Brewster, Adrienne Traxler, Jorge de la Garza, and Laird H. Kramer. Extending positive CLASS results across multiple instructors and multiple classes of Modeling Instruction. *Phys. Rev. Spec. Top. - Phys. Educ. Res.*, 9(2):020116, 2013
- 2012 Giovanni M. Mirouh, Pascale Garaud, Stephan Stellmach, Adrienne L. Traxler, and Toby S. Wood. A new model for mixing by double-diffusive convection (semi-convection). I. The conditions for layer formation. *The Astrophysical Journal*, 750(1):61, 2012
- 2011 Erica Rosenblum, Pascale Garaud, Adrienne Traxler, and Stephan Stellmach. Turbulent mixing and layer formation in double-diffusive convection: Three-dimensional numerical simulations and theory. *The Astrophysical Journal*, 731(1):66, 2011
- Adrienne Traxler, Pascale Garaud, and Stephan Stellmach. Numerically determined transport laws for fingering (“thermohaline”) convection in astrophysics. *The Astrophysical Journal Letters*, 728(2):L29, 2011
- Stephan Stellmach, Adrienne Traxler, Pascale Garaud, Nicholas Brummell, and Timour Radko. Dynamics of fingering convection. Part 2 The formation of thermohaline staircases. *Journal of Fluid Mechanics*, 677:554–571, 2011
- Adrienne Traxler, Stephan Stellmach, Pascale Garaud, Timour Radko, and Nicholas Brummell. Dynamics of fingering convection. Part 1 Small-scale fluxes and large-scale instabilities. *Journal of Fluid Mechanics*, 677:530–553, 2011

## Book Chapters

- 2020 (expected) | Adrienne Traxler and Jennifer Blue. Disability in physics: Learning from binary mistakes. In Allison Gonsalves and Anna Danielsson, editors, *Physics Education and Gender: Identity as an Analytic Lens for Research*. Springer, in press

## Work Under Review

- Adrienne Traxler and Jennifer Blue. Sex and gender as non-binary: What does this mean for physics teachers? *The Physics Teacher*, (under review)
- James Wells, Rachel Henderson, Adrienne Traxler, and John Stewart. Exploring the structure of misconceptions in the Force and Motion Conceptual Evaluation with modified module analysis. *Phys. Rev. Phys. Educ. Res.*, (under review)
- Adrienne Traxler. Who belongs in science: Numbers are not enough. In Samina Azad, editor, *Eliminating Gender Bias*. American Chemical Society, under review

## Work in Preparation

- Adrienne Traxler, Tyme Suda, Eric Brewe, and Kelley Commeford. Network positions in active learning environments in physics. (in preparation)
- Kelley Commeford, Eric Brewe, and Adrienne Traxler. Characterizing active learning environments in physics using network analysis and COPUS observations. (in preparation)

## Conference Proceedings

- 2019 | Carissa Myers, Elizabeth Fox, Adrienne Traxler, and A. Gavrin. Quantifying the linguistic persistence of high and low performers in an online student forum. In Michael B. Bennett, Steven Wolf, and Ying Cao, editors, *2019 Physics Education Research Conference*, PER Conference, Provo, UT, 2020
- Kelley Commeford, Eric Brewe, and Adrienne Traxler. Characterizing active learning environments in physics: Network analysis using exponential random graph models. In Michael B. Bennett, Steven Wolf, and Ying Cao, editors, *2019 Physics Education Research Conference*, PER Conference, Provo, UT, 2020
- 2018 | Carissa Myers, Adrienne Traxler, and A. Gavrin. Content analysis of instructor tools for building a learning community. In Adrienne Traxler, Ying Cao, and Steven Wolf, editors, *2018 Physics Education Research Conference*, PER Conference, Washington, DC, August 2018
- 2016 | Adrienne Traxler, Andrew Gavrin, and Rebecca Lindell. CourseNetworking and community: Linking online discussion networks and course success. In Dyan L. Jones, Lin Ding, and Adrienne Traxler, editors, *2016 Physics Education Research Conference*, pages 352–355, Sacramento, CA, 2016
- Emily Sandt and Adrienne Traxler. Non-traditional students' conceptual scores and network centrality in SCALE-UP classrooms. In Dyan L. Jones, Lin Ding, and Adrienne Traxler, editors, *2016 Physics Education Research Conference*, pages 296–299, Sacramento, CA, 2016

- 2015 Adrienne Traxler. Community structure in introductory physics course networks. In Alice D. Churukian, Dyan L. Jones, and Lin Ding, editors, *2015 Physics Education Research Conference*, pages 331–334, College Park, MD, 2015
- Adrienne Traxler, Jonathan V. Mahadeo, Daryl McPadden, and Eric Brewé. Multiple representations and epistemic games in introductory physics exam solutions. In Paula V. Engelhardt, Alice D. Churukian, and Dyan L. Jones, editors, *2014 Physics Education Research Conference*, pages 247–250, Minneapolis, MN, 2015
- 2014 Jonathan V. Mahadeo, Adrienne L. Traxler, and Eric Brewé. Epistemic games analysis of common exam questions across course formats. In Paula V. Engelhardt, Alice D. Churukian, and Dyan L. Jones, editors, *2013 Physics Education Research Conference*, pages 241–244, Portland, OR, 2014
- 2010 Adrienne L. Traxler, Katherine A. Kretke, and P. Garaud. A fluid dynamics activity for prospective graduate students. In Lisa Hunter and Anne Metevier, editors, *Learning from Inquiry in Practice*, volume 436, pages 258–263, Santa Cruz, CA, December 2010. Astronomical Society of the Pacific
- 2006 Adrienne L. Traxler, Katrina E. Black, and John R. Thompson. Students’ use of symmetry with Gauss’s law. In Laura McCullough, Leon Hsu, and Paula Heron, editors, *2006 Physics Education Research Conference*, volume 883, pages 173–176, Syracuse, NY, July 2006. American Institute of Physics

## Other Publications

- 2011 Adrienne L. Traxler. *Double-diffusive convection at high and low Prandtl numbers*. PhD thesis, University of California Santa Cruz, 2011
- 2010 Adrienne Traxler. Linear stability of Su-Gardner equations to small two-dimensional perturbations. Technical Report WHOI-10-01, Woods Hole Oceanographic Institution, 2010
- 2006 Adrienne L. Traxler. Assessment and modification of an introductory astronomy laboratory lesson on astronomical time-keeping. Master’s thesis, University of Maine, 2006

## Funded Research

**National Science Foundation:** WSU Students ASK... A Success & Scholarship Program for Students Applying Scientific Knowledge. August 2017–August 2022. Budget: \$997,589. Co-applicant (with Jason Deibel, PI, and Meredith Rodgers, co-PI).

**National Science Foundation:** Collaborative Research: Characterizing Active Learning Environments in Physics. July 2017–June 2020. Budget: \$299,981 total, \$73,485 to Wright State University. Main applicant (collaborative proposal with Eric Brewé, Drexel University).

**National Science Foundation:** Implementation Project: Improving Pathways for STEM Retention and Graduation. August 2015–July 2016. Budget: \$56,011. Main applicant at Wright State University (co-applicants Noah Schroeder, Douglas Petkie), subcontract from Central State University.

## Invited Talks and Workshops

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| 2020 | Adrienne Traxler. Network positions in active learning physics classes. Colloquium at Michigan State University, February 2020   |
| 2019 | <p>Adrienne Traxler. Role analysis of introductory physics collaboration networks. Physics department colloquium at Miami University, October 2019</p> <p>Adrienne Traxler. Asking different questions: Critical Theory lessons for physics education. Panelist at Physics Education Research Conference, Provo, UT, July 2019</p> <p>Adrienne Traxler. ASK the right questions: Student experiences in an undergraduate research program. Workshop at Institutional Change through Faculty Advancement in Instruction and Mentoring, Jackson State University, Jackson, MS, May 2019</p> <p>Adrienne Traxler. Dimensions of success: Aligning learning goals with instruction in introductory science courses. Workshop at Institutional Change through Faculty Advancement in Instruction and Mentoring, Jackson State University, Jackson, MS, May 2019</p>   |
| 2018 | <p>Adrienne Traxler. Equity in physics education: A snapshot of a complex system. Seminar at Center for the Advancement of STEM Teaching and Learning Excellence, Drexel University, October 2018</p> <p>Adrienne Traxler. Gender matters: Patterns of inequity in physics and STEM. Seminar at IC-FAIM Workshop, Jackson State University, May 2018</p> <p>Adrienne Traxler. Network analysis in education. Seminar at IC-FAIM Workshop, Jackson State University, May 2018</p> <p>Adrienne Traxler. Gender in physics education: Looking back and looking forward. Plenary talk at OSAPS/MI-AAPT 2018 Spring meeting, Michigan State University, March 2018</p>  |
| 2017 | <p>Adrienne Traxler and Jennifer Blue. Disability in physics: Lessons from the binary view of gender. Invited talk at European Science Education Research Association meeting, Dublin, Ireland, August 2017</p> <p>Adrienne Traxler. “What are you?” – considerations and best practices in operationalizing identity through demographic variables. Panelist at Physics Education Research Conference, Cincinnati, OH, July 2017</p> <p>Adrienne Traxler. As exceptional as any monstrosity: Gaps analyses past and present. Invited talk at American Association of Physics Teachers meeting, Cincinnati, OH, July 2017</p> <p>Adrienne Traxler. Professional skills for graduate students. Panelist at American Association of Physics Teachers meeting, Atlanta, GA, February 2017</p> <p>Adrienne Traxler. Enriching gender in physics education research: A binary past and a complex future. Invited talk at 2017 American Physical Society April Meeting, Washington, DC, January 2017</p> |
| 2016 | Adrienne Traxler. Multiplex network analysis of student interactions in an introductory physics course. Physics Education Research group seminar at The Ohio State University, October 2016  |

- 2015 Adrienne Traxler. Using network analysis to describe collaboration in introductory physics. Physics department colloquium at Miami University, September 2015
- Adrienne Traxler. Gender in physics education research: A binary past and a complex future. Physics department colloquium at Purdue University, September 2015
- Adrienne Traxler. Equity perspectives and attitude shifts in introductory physics. Invited talk at American Association of Physics Teachers summer meeting, College Park, MD, July 2015
- Adrienne Traxler. Attitude shifts in introductory physics: An equity perspective. Physics department colloquium at Michigan State University, February 2015
- 2014 Adrienne Traxler. Epistemic games as an analysis tool for physics final exam questions. Physics department colloquium at Wright State University, February 2014
- Adrienne Traxler. Attitudinal shifts in introductory physics through an equity lens. Invited talk at American Association of Physics Teachers winter meeting, Orlando, FL, January 2014
- 2013 Adrienne Traxler. A study of common exam questions and epistemic games in physics. Physics department colloquium at Purdue University, November 2013
- Adrienne Traxler. Positive attitudinal shifts in physics with modeling instruction. Global Physics Department colloquium, October 2013
- Adrienne Traxler. Physics exam problems as a deployment of epistemic games. Physics department colloquium at Ohio State University, October 2013
- Adrienne Traxler. Complexity of faculty change in the FIU Science Collaborative. Invited talk at American Association of Physics Teachers summer meeting, Portland, OR, July 2013
- 2012 Adrienne Traxler. Salt fingering at high and low Prandtl numbers. Physics department colloquium at Florida International University, February 2012
- 2011 Adrienne Traxler. Salt fingering in oceans and stars. Physics department colloquium at Sonoma State University, March 2011

## Contributed Talks and Posters

- 2019 Adrienne L. Traxler, Carissa Myers, Jason Deibel, and Meredith Rodgers. Network analysis of students' descriptions of scientific research. Contributed poster at 2019 Physics Education Research Conference, Provo, UT, July 2019
- Carissa Myers, Elizabeth Fox, Adrienne Traxler, and A. Gavrin. Quantifying the linguistic persistence of high and low performers in an online student forum. Contributed poster at 2019 Physics Education Research Conference, Provo, UT, 2019
- Tyme Suda, Adrienne Traxler, Eric Brewe, and Kelley Commeford. Student network positions in active learning physics classrooms. Contributed poster at American Association of Physics Teachers summer meeting, Provo, UT, July 2019

- Kelley Commeford, Eric Brewe, and Adrienne Traxler. Characterizing active learning environments in physics. Contributed talk at American Association of Physics Teachers summer meeting, Provo, UT, July 2019
- James Wells, Rachel Henderson, John Stewart, and Adrienne Traxler. Exploring FCI misconceptions by gender using Modified Module Analysis. Contributed talk at American Association of Physics Teachers summer meeting, Provo, UT, July 2019
- Jason A. Deibel, Adrienne L. Traxler, and Meredith Rodgers. Applying Scientific Knowledge (ASK): A transformative approach to integrating and scaling up undergraduate research. Contributed talk at 2019 CUR Undergraduate Research Programs Conference, Columbus, OH, June 2019
- Jason A. Deibel, Adrienne L. Traxler, and Meredith Rodgers. Applying Scientific Knowledge (ASK): A transformative approach to integrating and scaling up undergraduate research. Contributed talk at 2019 Ohio-PKAL Annual Conference, Dayton, OH, May 2019
- Kelley Commeford, Eric Brewe, and Adrienne Traxler. Characterizing Active Learning Environments in Physics: Preliminary results. Contributed talk at 2019 American Physical Society meeting, Denver, CO, April 2019
- Suhaela Eledkawi, Adrienne Traxler, and A. Gavrin. Talking physics online: Do different conversation models affect forum network structure? Contributed poster at 2019 Ohio Louis Stokes Alliance for Minority Participation Conference, Cincinnati, OH, April 2019
- Carissa Myers, Elizabeth Fox, Adrienne Traxler, and A. Gavrin. Recurrence quantification of student discourse. Contributed poster at CogFest 2019, Columbus, OH, March 2019
- 2018 Carissa Myers, Adrienne Traxler, and A. Gavrin. Content analysis of instructor tools for building a learning community. Contributed poster at 2018 Physics Education Research Conference, Washington, DC, August 2018
- Kelley Commeford, Eric Brewe, and Adrienne Traxler. Characterizing Active Learning Environments in Physics. Contributed talk at 2018 Physics Education Research Conference, Washington, DC, July 2018
- Rachel Henderson, John Stewart, and Adrienne Traxler. A synthesis of the gender gap on the conceptual inventories. Contributed talk at 2018 American Physical Society meeting, Washington, DC, July 2018
- 2017 Kelley Commeford, Eric Brewe, and Adrienne Traxler. Characterizing Active Learning Environments in Physics: Establishing a baseline. Contributed poster at 2017 Physics Education Research Conference, Cincinnati, OH, July 2017
- Andy Rundquist, Gillian Ryan, Adrienne Traxler, Jeremy Bailin, and Melissa Dancy. Lessons learned from facilitating Faculty Online Learning Communities. Contributed talk at 2017 American Physical Society meeting, Cincinnati, OH, July 2017
- Rachel Henderson, John Stewart, Adrienne Traxler, and Rebecca Lindell. Item Response Theory on the Force and Motion Conceptual Evaluation. Contributed talk at 2017 American Physical Society meeting, Cincinnati, OH, July 2017

- Adrienne Traxler, A. Gavrin, and Rebecca Lindell. Network analysis of physics discussion forums and links to course success. Contributed poster at 2017 American Physical Society April Meeting, Washington, DC, January 2017
- Rebecca Lindell and Adrienne Traxler. Uncovering introductory astronomy students' conceptual modules of lunar phases. Contributed poster at 2017 American Physical Society April Meeting, Washington, DC, January 2017
- 2016 Adrienne Traxler, A. Gavrin, and Rebecca Lindell. CourseNetworking and community: Linking online discussion networks and course success. Poster at 2016 Physics Education Research Conference, Sacramento, CA, July 2016
- Jesper Bruun and Adrienne Traxler. Investigating physics learning with layered student interaction networks: Combining time and modes of interaction. Invited poster at 2016 Physics Education Research Conference, Sacramento, CA, July 2016
- Sarah Hierath and Adrienne L. Traxler. Network analysis, conceptual gains, and gender in introductory physics. Contributed poster at 2016 Physics Education Research Conference, Sacramento, CA, July 2016
- Alexis Papak, Adrienne Traxler, and Rebecca Lindell. Viewing gender differences on the FCI through a psychometric lens. Contributed poster at 2016 Physics Education Research Conference, Sacramento, CA, July 2016
- Emily Sandt and Adrienne L. Traxler. Non-traditional students' conceptual scores and network centrality in SCALE-UP classes. Contributed poster at 2016 Physics Education Research Conference, Sacramento, CA, July 2016
- Adrienne Traxler, Gillian Ryan, Andy Rundquist, Joel Corbo, and Melissa Dancy. Improved recruitment to build a better Faculty Online Learning Community. Contributed talk at American Association of Physics Teachers summer meeting, Sacramento, CA, July 2016
- Alexis Papak, Adrienne Traxler, and Rebecca Lindell. Viewing gender differences on the FCI through a psychometric lens. Contributed poster at American Association of Physics Teachers winter meeting, New Orleans, LA, January 2016
- 2015 Adrienne Traxler. Multiple measures of active learning in physics. Contributed poster at Wright State University Teaching for Student Success Symposium, Dayton, OH, August 2015
- Adrienne Traxler. Community structure in introductory physics course networks. Contributed poster at 2015 Physics Education Research Conference, College Park, MD, July 2015
- Sarah Hierath, Emily Sandt, and Adrienne Traxler. Network centrality and conceptual gains in an introductory physics course. Contributed poster at Wright State University Celebration of Research, Scholarship and Creative Activities, Dayton, OH, April 2015
- Jennifer Blue and Adrienne L. Traxler. Enriching gender in physics education research: A binary past and a complex future. Contributed talk at Miami University Race, Class, Gender, and Sexuality Symposium, Oxford, OH, February 2015



- 2014 Adrienne L. Traxler, Jonathan V. Mahadeo, Daryl McPadden, and Eric Brewe. Multiple representations and epistemic games in introductory physics exam solutions. Contributed poster at 2014 Physics Education Research Conference, Minneapolis, MN, July 2014
- Adrienne L. Traxler, Laird Kramer, Eric Brewe, David Brookes, Joseph Lichter, and Marcy Lowenstein. Research-based reform: Faculty as change agents in multiple departments. Invited poster at 2014 Physics Education Research Conference, Minneapolis, MN, July 2014
- Seth Manthey, Eric Brewe, Sat Gavassa, Adrienne Traxler, Laird Kramer, George E. O'Brien, Eric von Wettberg, and Marcy Lowenstein. A multi-measure assessment of course type efficacy between traditional lecture and online instruction General Biology I at a large public Hispanic-serving university, July 2014. Contributed talk at Society for the Advancement of Biology Education Research Annual Meeting, Minneapolis, MN
- Seth Manthey, Eric Brewe, Eric von Wettberg, George E. O'Brien, and Adrienne Traxler. General biology students' attitudes towards biology at a Hispanic-serving university, July 2014. Contributed poster at Society for the Advancement of Biology Education Research Annual Meeting, Minneapolis, MN
- 2013 Adrienne L. Traxler, Eric Brewe, and Laird Kramer. An equity investigation of attitudinal shifts in introductory physics. Contributed poster at 2013 Physics Education Research Conference, Portland, OR, July 2013
- Jonathan Mahadeo, Adrienne L. Traxler, and Eric Brewe. Epistemic analysis of common exam questions across course formats. Contributed poster at 2013 Physics Education Research Conference, Portland, OR, July 2013
- Adrienne L. Traxler, Laird Kramer, Eric Brewe, David Brookes, Joseph Lichter, and Ophelia Weeks. Exploring faculty change in the FIU Science Collaborative. Contributed poster at American Association of Physics Teachers summer meeting, Portland, OR, July 2013
- Jonathan Mahadeo, Adrienne L. Traxler, and Eric Brewe. Exploring different course formats via AP scores and epistemic games. Contributed talk at American Association of Physics Teachers summer meeting, Portland, OR, July 2013
- Konstantinos Kavallieratos, Adrienne L. Traxler, Joseph L. Lichter, C. Burns, L. Fernandez, M. Luzzi, and J. Torner. Transforming the CHM 1033 "Survey of Chemistry" class for nursing students using the Learning Assistant (LA) model: Challenges and rewards. Contributed talk at 245th American Chemical Society National Meeting, New Orleans, LA, 2013
- 2012 Amber Frazier, Adrienne L. Traxler, and Laird Kramer. Do common exam question scores vary significantly between different modes of instruction? Contributed poster at 2012 Physics Education Research Conference, Philadelphia, PA, July 2012
- Adrienne L. Traxler, Laird Kramer, Eric Brewe, David Brookes, Ophelia Weeks, and Joseph Lichter. Assessment opportunities and challenges in the FIU Science Collaborative. Contributed poster at 2nd Conference on Transforming Research in Undergraduate STEM Education, St. Paul, MN, June 2012

## Teaching Experience

### Wright State University

- **Undergraduate Physics Seminar I (PHY 1000, 1 credit.)** (F2018, F2019) Introductory undergraduate seminar, 5–10 students.
- **General Physics I (PHY 2400, 4 credits).** (F2014, Su2015, F2015, Sp2016, F2016, F2017, F2018, F2019, Sp2020) Introductory undergraduate, 10–220 students. Calculus-based course covering Newtonian mechanics.
- **Introduction to Astrophysics (PHY 3300, 3 credits).** (Sp2018, Sp2019) Upper-division undergraduate, 5–15 students. Developed new astrophysics course.
- **Analytical Mechanics (PHY 3710/5710, 3 credits).** (Sp2017, Sp2018, Sp2019, Sp2020) Upper-division undergraduate and cross-listed as graduate, 10–20 students. Newtonian mechanics using ordinary differential equations, with computational assignments in Matlab.
- **Senior Project (PHY 4940, 3 credits).** (F2017, Sp2018, F2018, Sp2019) Capstone undergraduate independent study format, 1–2 students.
- **Special Topics in Physical Science for Teachers (PHY 6990, 3 credits).** (F2017, F2018) Graduate, online format, 1–2 students. Developed new course for high school teachers seeking certification to teach college-credit physics courses. Pedagogical readings, writing, and discussion around introductory course content.
- **Minor Problems (PHY 7990, 3 credit hours).** (F2014, Sp2015) Graduate, independent study format, 1–2 students. Research credits taken by graduate students before formally submitting thesis proposal.
- **Research (PHY 8990, 3 credit hours).** (F2015, Sp2016, Su2016, F2017, Sp2017, Su2017, F2017, Sp2018) Graduate, independent study format, 1–3 students. Thesis project credits.

### Florida International University

- **Calculus-based Physics I (PHY 2048, 4 credit hours).** (F2012) Introductory undergraduate lecture and laboratory (studio format), 25–30 students. Calculus-based.
- **Calculus-based Physics II (PHY 2049, 4 credit hours).** (Sp2013) Introductory undergraduate lecture and laboratory (studio format), 25–30 students. Second semester of Modeling Instruction course above (PHY 2048), covering electricity and magnetism.

## Leadership Positions

- **American Physical Society** Forum on Education Member-at-Large, Spring 2019–present.
- **Physics Education Research Conference Proceedings** Editor, Spring 2016–Spring 2019
- **American Association of Physics Teachers** Committee on Women in Physics (member, 2015; vice chair, 2016; chair, 2017)
- **Faculty Online Learning Community** Peer Leader for APS/AAS/AAPT Physics and Astronomy New Faculty Workshop (Spring 2016–Fall 2017)
- **Southern Ohio Section of the American Association of Physics Teachers** Vice-president for four-year colleges (Spring 2018–Spring 2019), treasurer (Spring 2019–present)
- **PERLOC** (Physics Education Research Leadership and Organizing Committee), January 2020–present

## Other Service

### Review Work

- **Journals:** American Journal of Physics, CBE – Life Sciences Education, European Journal of Physics, International Journal of Research and Method in Education, Physical Review Physics Education Research, The Physics Teacher, Physics Education Research Conference Proceedings, Proceedings A, Science Advances
- **Grants:** National Science Foundation