

Alanna Pawlak

Curriculum Vitae

Education

- 2012 – 2018 **Doctor of Philosophy, Physics**, *Michigan State University*, East Lansing, Michigan.
Thesis: Collaborative Learning Environments in Introductory Physics.
Advisor: Marcos D. Caballero
- 2008 – 2012 **Bachelor of Science, Physics and Mathematics**, *DePaul University*, Chicago, Illinois.
Magna Cum Laude

Teaching Experience

Formal Teaching

- 2021 – present **Assistant Teaching Professor**, *Physical Sciences Division*, University of Washington Bothell.
Responsible for teaching and managing a variety of physics courses, including laboratory and lecture courses, and lower and upper division courses. I also engage in course design and curriculum development, mentor students in conducting physics education research projects, and provide general and academic support for students.
- 2020 **Lecturer**, *Department of Physics*, University of Colorado Boulder.
Instructor of record for a general education lecture-based physics course. The course covered a variety of topics from mechanics, electricity and magnetism, and modern physics through the investigation of everyday phenomena and items. I taught this course in a synchronous virtual format with an enrollment of 115 students. As instructor of this course, I developed and implemented interactive lectures, activities to support student engagement and interaction, quantitative and conceptual homework assignments, and open response exams that could be taken remotely. I also designed multiple ways for students to engage with coursework to accommodate students with differing needs, abilities, and preferences. Additionally, I trained and supervised a graduate teaching assistant, managed the course learning management system, and held office hours.

- 2020 **Adjunct Faculty**, *Science Department*, Front Range Community College.
 Instructor of an algebra-based introductory mechanics course, including both lecture and laboratory. In this course I developed and implemented interactive lectures, collaborative group work activities, individual and group exams, and exploratory laboratory activities to support students' conceptual understanding of physics and their confidence in their ability to do physics. As the sole instructor of this course, I also managed the course learning management system, grade reporting, and other course logistics. In navigating the shift to remote teaching due to COVID-19, I adapted my course materials to support student learning in an online format, including synchronous class meetings utilizing video software with breakout rooms to allow student collaboration, weekly office hours through video software, laboratory exercises adapted to be done at home with common materials, and asynchronous discussion boards to aid students in forming study groups remotely.
- 2019 **Instructor**, *Department of Physics*, University of Colorado Boulder.
 Co-instructor in an interactive lecture-style modern physics course for physics and engineering majors. I facilitated student discussions during class, delivered interactive lectures, used demonstrations, and held office hours. The course covered standard topics such as the photoelectric effect, the wave-particle nature of light and matter, and different atomic models, and also included a unit on the nature of science and scientific knowledge and a unit on representation and equity in physics.
- 2016 – 2017 **Instructor of Record**, *Department of Physics and Astronomy*, Michigan State University.
 Lead instructor for one semester and co-instructor for two semesters in a 100 student enrollment problem-based learning introductory mechanics course for physics and engineering majors. As an instructor, I worked closely with students, guiding them to build their own understandings as they worked in small groups. I also mentored faculty member co-instructors who were less experienced in the problem-based learning format, and trained and supervised 10-15 undergraduate learning assistants, facilitating three meetings each week in which we discussed content, pedagogy, and managing difficulties in the classroom. Additionally, I managed course logistics and content development.
- 2016 **Graduate Teaching Assistant**, *Department of Physics and Astronomy*, Michigan State University.
 Co-instructor in an introductory laboratory course for physicists and engineers centered around discovery-based labs. I facilitated groups of students in finding unique ways of investigating the target phenomena in ways that interested them, while still ensuring they engaged with the relevant concepts.
- 2016 **Instructor**, *Lyman Briggs College*, Michigan State University.
 Lead instructor for 4 weeks in a large enrollment, interactive lecture-style introductory electricity and magnetism course for life science majors while the professor of record was out of the country. I handled all course management, including developing and giving interactive lectures and managing course logistics.
- 2013 – 2016 **Graduate Teaching Assistant**, *Lyman Briggs College*, Michigan State University.
 Teaching assistant in large enrollment, interactive lecture-style introductory physics courses on mechanics and electricity and magnetism for life science majors. I developed curriculum, lectured when the primary instructors were unavailable, and assisted with course logistics. I also worked in the laboratory component of the course, where I taught laboratory sections, developed curriculum, and supervised 5-10 undergraduate learning assistants.

- 2015 **Guest Instructor**, *Lyman Briggs College*, Michigan State University.
Instructor for one meeting of the laboratory component of an introductory physics course. I developed and taught with a team a one-day inquiry-based activity on conservation of linear and angular momentum.
- 2014 **Guest Instructor**, *Lyman Briggs College*, Michigan State University.
Instructor for one meeting of the laboratory component of an introductory physics course. I developed and taught with a team a one-day inquiry-based activity on conservation of energy.
- 2012 – 2013 **Graduate Teaching Assistant**, *Department of Physics and Astronomy*, Michigan State University.
Instructor in introductory laboratory courses for physicists and engineers centered around traditional laboratory exercises. I guided pairs of students in making measurements and analyzing data to investigate physical laws.
- Informal Teaching, Mentorship, and Facilitation**
- 2016 – 2018 **Research Mentor**, *Department of Physics and Astronomy*, Michigan State University.
Co-mentored several undergraduate students through research projects in physics education research. Many of these projects resulted in peer-reviewed publications and presentations at national conferences for the students.
- 2014 – 2018 **Graduate Teaching Assistant Workshop Coordinator**, *Department of Physics and Astronomy*, Michigan State University.
Co-facilitator of a 1.5 day long workshop for incoming physics and astronomy graduate students on teaching and learning. I co-led sessions on active learning, research-based teaching practices, and how to handle challenging situations. I co-developed the workshop the first year it was implemented and was involved in its implementation and revision every following year.
- 2014 **Session Coordinator**, *Grandparents' University*, Michigan State University.
Co-facilitator of a one-day physics activity for elementary students and their grandparents as part of an outreach program at Michigan State University. I guided the children and their grandparents through a discovery-based activity investigating lenses and vision.

Research Experience

- 2019 – 2021 **Research Associate**, *Center for STEM Learning*, University of Colorado Boulder.
Facilitated and conducted research regarding the work of teams participating in the Teaching Quality Framework (TQF) Initiative. The TQF Initiative supports teams composed of 3-5 faculty members in a department as they work on projects relating to improving the teaching evaluation practices in their department, for example through the development of new teaching observation protocols and procedures. My facilitation involved leading and organizing teams' meetings as they work on these items, providing expertise on best practices regarding teaching evaluation, and connecting teams to College and University-level resources. My research regarding the TQF Initiative focused on comparing the TQF approach to departmental change to other approaches, such as the Departmental Action Team Project, also based at the University of Colorado Boulder.

- 2018 – 2020 **Research Associate**, *Center for STEM Learning*, University of Colorado Boulder.
Facilitated and conducted research regarding the work of Departmental Action Teams (DATs), which are teams of students, staff, and faculty members working collaboratively on initiatives to improve the undergraduate education in their departments. My facilitation involved guiding teams through visioning processes to come to consensus on projects to pursue, guiding teams in carrying out those projects, and providing expertise on education research. My personal research used qualitative education research methods to investigate the experiences of team members, specifically focusing on how DAT members develop change agency. I also contributed to several other research projects studying the DAT Model and to a published practitioner-focused book aimed at supporting those who want to form and facilitate similar teams themselves.
- 2012 – 2018 **Graduate Research Assistant**, *Department of Physics and Astronomy*, Michigan State University.
Used qualitative education research methods to investigate student and instructor engagement with collaborative physics learning environments. This work included studies on how students reason through conceptual physics problems in groups, how students interact in collaborative physics learning environments, and how undergraduate learning assistants approach teaching computational problems in collaborative learning environments. My research methods included phenomenography and thematic analysis, and the data sources I analyzed included in situ classroom video recordings, written artifacts of student work, and semi-structured interviews, which I conducted. One study from my graduate research has been published in *Physical Review Physics Education Research*, one study is in press for publication in *Physical Review Physics Education Research*, and one study was published in the *Proceedings of the Physics Education Research Conference*.
- 2010 – 2012 **Undergraduate Research Assistant**, *Physics Division*, Argonne National Laboratory.
Assisted in accelerator target fabrication and measurement and developed a program for measuring target thickness using alpha particle energy loss measurements and Stopping Range of Ions in Matter data.

Professional Development

- 2014 and 2015 **Institute for Scientist and Engineer Educators Professional Development Program**.
Participated twice in a professional development program for STEM educators in which teams of graduate students and post-doctoral researchers attend two multi-day workshops on inquiry-based education and designing inquiry activities, then design and implement an inquiry-based activity at their home institution. My second year of participation, I served as the team leader of the team from Michigan State. Over the course of six months, I led my team in developing an inquiry activity for introductory physics, which we then implemented in an introductory laboratory course at Michigan State University.

Awards and Honors

- 2016 **Outstanding Graduate Teaching Assistant for the Lower Division**, *Department of Physics and Astronomy*, Michigan State University.

Service

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4/7

- 2019 – **Physics Education Research Early Career Group.**
 present Am a founding member and organizer of a national professional organization that supports recent graduates, postdoctoral researchers, and new faculty in the physics education research community.
- 2012 – 2018 **Women and Minorities in the Physical Sciences**, Michigan State University.
 Was an active member of an organization dedicated to promoting and supporting diversity within the physical sciences. Additionally served on the executive board of the organization for two years, participating in the planning and running of events such as topical discussions, meet-the-speaker opportunities, and social functions.
- 2014 – 2018 **Physics Education Research Consortium of Graduate Students.**
 Was an active member of a national professional organization for graduate students in physics education research.
- 2012 – 2018 **Physics Graduate Organization**, Michigan State University.
 Was an active member in the Department of Physics and Astronomy's graduate student organization, including presenting at the graduate research colloquium, facilitating topical discussions, and communicating the work of the University committees on which I served.
- 2014 – 2016 **College of Natural Science Student Advisory Council**, Michigan State University.
 Served as co-chair for one year and as the Department of Physics and Astronomy graduate student representative for another on a College-level committee composed of undergraduate and graduate students from each department within the College of Natural Science that advised the Dean and provided student perspectives on College issues and initiatives.
- 2014 – 2015 **Department of Physics and Astronomy Graduate Curriculum Committee**, Michigan State University.
 Served as a voting member on a committee that controls changes to the Department of Physics and Astronomy graduate curriculum. Additionally served on a subcommittee that assessed and proposed revisions to the graduate program's comprehensive exam format and content.
- 2014 – 2015 **Graduate Employees Union**, East Lansing, MI.
 Advocated for the rights of graduate teaching assistants within the Department of Physics and Astronomy.

Professional Societies

- 2014 – **American Association of Physics Teachers.**
 present
- 2014 – **American Physical Society.**
 present

Publications

A. Pawlak, P. W. Irving, and M. D. Caballero. Learning assistant approaches to teaching computational physics problems in a problem-based learning course. *Physical Review Physics Education Research*, 16(1), 2020.

C. Ngai, J. C. Corbo, K. L. Falkenberg, C. Geanious, **A. Pawlak**, M. E. Pilgrim, G. M. Quan, D. L. Reinholz, C. Smith, and S. B. Wise. Facilitating Change in Higher Education: The Departmental Action Team Model. *Glitter Cannon Press*, 2020.

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5/7

D. L. Reinholz, **A. Pawlak**, C. Ngai, and M. Pilgrim. Departmental Action Teams: Empowering students as agents of change in STEM departments. *International Journal for Students as Partners*, 4(1), 2020.

G. M. Quan, J. C. Corbo, N. D. Finkelstein, **A. Pawlak**, K. Falkenberg, C. Geanious, C. Ngai, C. Smith, S. Wise, M. E. Pilgrim, and D. L. Reinholz. Designing for institutional transformation: Six principles for department-level interventions. *Physical Review Physics Education Research*, 15(1), 2019.

A. Pawlak, P. W. Irving, and M. D. Caballero. Development of a Modes of Collaboration Framework. *Physical Review Physics Education Research*, 14, 2018.

A. Pawlak, P. W. Irving, and M. D. Caballero. Identification of a shared answer-making game in a group context. *Proceedings of the 2015 Physics Education Research Conference*, 2015.

J. P. Greene, **A. Pawlak**, S. Zhu, and U. Garg. Preparation of isotopic antimony targets. *Journal of Radioanalytical and Nuclear Chemistry*, 299(2), 2014.

Selected Research Presentations

A. Pawlak. Learning assistant approaches to teaching computational physics problems in a problem-based learning course. University of Oslo, June 15 2021, virtual. Invited talk.

A. Pawlak. Learning assistant approaches to teaching computational physics problems in a problem-based learning course. University College Dublin, April 29 2021, virtual. Invited talk.

A. Pawlak and N. D. Finkelstein. The Teaching Quality Framework Initiative: Valuing and Improving Teaching and Teaching Evaluation. Physics Education Research Conference 2020, July 23 2020, virtual. Invited talk.

A. Pawlak. Improving education through departmental change: a comparison of approaches. Summer National Meeting 2020, American Association of Physics Teachers, July 21 2020, virtual. Contributed talk.

A. Pawlak. Developing change agency and valuing participation in Departmental Action Teams. Summer National Meeting 2019, American Association of Physics Teachers, July 22 2019, Provo, UT. Contributed talk.

A. Pawlak. Learning assistant approaches to teaching computational physics problems in a problem-based course. Summer National Meeting 2018, American Association of Physics Teachers, July 30 2018, Washington D.C.. Contributed talk.

A. Pawlak. Instructor approaches to teaching computational physics problems in

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6/7

problem-based courses. Spring Meeting 2018, Michigan Section of the American Association of Physics Teachers, March 24 2018, East Lansing, MI. Contributed talk.

A. Pawlak. A modes of collaboration framework for student engagement. Science Seminar Series, Delta College, January 10 2018, University Center, MI. Invited talk.

A. Pawlak. How students engage in modes of collaboration. Physics Graduate Organization Seminar Series, Michigan State University, October 9 2015, East Lansing, MI. Contributed talk.

A. Pawlak. Follow the rules: how students use epistemic games in problem-solving. Physics Graduate Organization Seminar Series, January 30 2015, East Lansing, MI. Contributed talk.

A. Pawlak. How students achieve satisfactory solutions while solving problems in groups. Fall Meeting 2014, Michigan Section of the American Association of Physics Teachers, October 4 2014, Flint, MI. Contributed talk.

A. Pawlak. How students choose and use visual representations in electricity and magnetism. Spring Meeting 2014, Michigan Section of the American Association of Physics Teachers, April 12 2014, Kalamazoo, MI. Contributed talk.