

CO/WY AAPT Section Spring Meeting

For virtual attendees, please use the zoom link:

<https://udenver.zoom.us/j/82152529712>

Probable Schedule Saturday, April 9th

8:00a	Ice breakers/Meet and Greet
8:45a	Ed Prather
9:45a	Contributed Talks – Armstrong, Edwards
10:45a	Break
11:00a	Marianna Ruggerio
12:00p	Business Meeting
12:45p	Lunch
1:15p	Contributed Talk – Klein
1:45p	Contributed Workshop – Belleau/Quinty –“Inclusivity through Evidence: self-advocacy through disciplinary practices”
2:30p	Building Bridges Parallel session: <ul style="list-style-type: none">• NGSS Workshop for University Participants (Shannon Wachowski)• University Student Q&A Panel for High School Participants
3:00p	Break + “What can you do with a physics degree?” Career Networking Event
4:00p	Demo Sharing <ul style="list-style-type: none">• 10 demos, challenge is to make a compelling presentation, 20 minutes to learn the demo, lightning presentations of the demos
4:45p	Adjourn

8:00 – 8:45 AM Registration, Welcome, Orientation, Refreshments

8:45 - 9:45 AM (Speaker is Remote)

Ed Prather

University of Arizona, Dept of Astronomy, eprather@arizona.edu

Unpacking elements of equitable and inclusive Astronomy classrooms that improve students discipline fluency and self-efficacy.

Collaborators working with the Center for Astronomy Education (CAE) have spent decades developing active learning activities that allow students to investigate a wide range of science representations specifically designed to promote discipline fluency, critical thinking, and self-efficacy. Evaluation of students understanding has provided insight into how effective implementation of these instructional strategies can create classrooms that provide equitable and inclusive environments for learning.

<https://scholar.google.com/citations?user=JuhxPUIAAA&hl=en>

9:45 – 10:15 AM (Speaker is in-person)

Dennis Edwards

Ramstein High School, Germany, Retired, dennis.edwards37@gmail.com

Alphorn and Physics

A performance-based presentation featuring some math and physics using my 3.4 m Alphon. Be prepared for some musical sections, some physics, some trivia, and some ways to interest your research-oriented physics/math/music students.

10:15-10:45 AM (Speaker is in-person)

Zach Armstrong

Greeley West High School, zarmstrong@greeleyschools.org

Freshman Physics in High School

The 'right' order for high school science courses has been hotly contested. Is physics an upper level science course or is it better for under classman? The Greeley Evans School district made the decision to switch to physics for all freshman in high school, starting in the 2020-2021 school year. Now, nearly two years into the transition we can say this was a great decision. The rational for the change, the process, and the lessons learned will be discussed.

10:45 – 11:00 AM Break

11:00 – 12:00 PM (Speaker is Remote)

Marianna Ruggerio

Auburn High School, Rockford, IL, mrugger2@gmail.com

Helping Students Develop into More Expert-like Problem Solvers

As physics educators we often take for granted the many processes and visualizations we perform in our heads. Teaching physics we are required to not only teach content, but also teach the process through which we approach and solve problems. One of the distinguishing attributes of first year physics students is the novice-style approach to solving problems, typically based upon common variables or equation hunting. Having students shift to more expert-like strategies, based upon more overarching ideas or concepts is often a challenge in physics teaching, but can be achieved by making this process visible and concrete to novice learners.

<https://physicsteachermomma.com/author/mariannaruggerio/>

12:00 – 12:45 AM

AAPT Section Business Meeting

Jasmine Andersen, CO-WY Section President, jasmine.knudsen@gmail.com

All are welcome to attend (*in fact, you may not get lunch unless you attend*). This is a time to find out about things happening in the Colorado-Wyoming Section and nationally. We will also be selecting the site for the meeting in Spring 2021 and holding an election.

12:45 – 1:15 PM

Lunch Break

Lunch will be served in the Rotunda for in-person attendees.

1:15-1:45 PM (Speaker is in-person)

Nadene Klein

Daniel C Oakes High School, Castle Rock, CO, naklein@dcsdk12.org

Open Ended Labs

I will share a process to frame students designing and conducting their own experiments in the middle or high school lab. I have found a lot of success with this process with increased student engagement and science learning. Real student examples will also be shared.

1:45 – 2:30 PM (Speakers are in-person)

Emily Quinty and Shelly Belleau

PEER Physics - University of Colorado Boulder, shelly.belleau@peerphysics.org

Inclusivity through Evidence: Self-advocacy through disciplinary practices

What is it about how students engage with physics that perpetuates inequities in physics courses and in the field of physics more broadly? In this interactive workshop, participants will consider tents of inclusive physics instruction and contribute to a broader conversation about power structures and pedagogy that facilitate inclusivity. By analyzing videos of students working in an NGSS-style learning environment with PEER Physics, participants will consider how curriculum, pedagogy, and teacher moves can cultivate more equitable environments. PEER Physics disrupts traditional power structures that exist in classrooms, enhancing students' voice both in authoring ideas and sanctioning ideas. Participants will consider what counts as success in a physics class and when and how people are recognized and rewarded. Participants will gain access to discussion protocols, student-facing physics lessons, and be invited to communities that support this work.

2:30 – 3:00 PM (Speakers are Remote and in-person)

Concurrent Sessions

Shannon Wachowski

EdReports, shannonwachowski@gmail.com

NGSS Introductory Workshop for University Participants

The Next Generation Science Standards (NGSS) are used as models for state science standards across the nation. What makes them different than previous versions of standards? Will teaching be any different? What do they say about physics? *The target audience is higher education faculty who have little to no familiarity with NGSS.*

Facilitator, TBD

University Student Q&A Panel for High School Participants

This session features several university students from schools across the state(s) who will share some of their perspectives on the transition from high school to college as they became science majors. *The target audience is high school faculty who wonder if they are providing adequate preparation for STEM students studying in college.*

Cecilia Dauer, CSU LSOP intern and physics major

Piper Nichols, Colorado School of Mines senior

Leah Huzjak, University of Denver senior

3:00- 4:00 PM (Speakers are in-person and remote)

A collection of guests will be available for informal discussions about:

What can you do with a physics degree?

This will be an opportunity to informally visit with in-person and remote guests who have found both traditional and non-traditional careers using the knowledge, skills, and attitudes available from the study of physics as an undergraduate.

In-person guests:

Taletha Maricle-Fitzpatrick has a BS in Aerospace Physics and an MS in Systems Engineering. She currently works at Lockheed Martin Space as a Senior Project Engineer where she is responsible for over \$100 million in human and deep space structural and mechanical assemblies programs including Orion/Artemis, Europa, Janus and Lunar Trailblazer.

Alex Leith received his undergraduate degree in physics in 2017. In 2019, he started his own shipping container tracking business called Maritime Operations Consulting LLC for the purpose of matching cargo vessels with open ports in a timely fashion. He currently works in telecommunications as an engineer/supervisor in the planning and design department at Comcast.

Erin Zekis has a BS in physics from Rose-Hulman Institute of Technology and an MS in Astrophysical and Planetary Sciences from CU Boulder. Since graduating, she has taught high school math and physics in Denver, and for the last five years has worked for Ball Aerospace, writing software for satellite components that provide altitude determination in orbit.

Angie Davidson received a BS from Cal Poly - San Luis Obispo in 2008. She joined Teach for America to teach in some of the most challenging schools in the nation. After spending nearly a decade teaching in the middle and high-school math realm, she wanted more technical challenges. She earned her Masters' in Physics at the University of Denver in 2019 with a focus on Spintronics and Physics Education Research. Finally, she stumbled upon software development. Now she is a software engineer at VMware and solves puzzles on a daily basis. She is still passionate about teaching, equity, and physics, and in her spare time she is developing a platform to build a community for women and minorities to succeed in the physics world.

Abigail (Abi) Grotelueschen earned a B.S. in Physics with a concentration in computational physics from DU in 2019. While at DU, she was involved in optics and particle physics research. Since September 2019, she has worked as a Physicist at Arcfield (formerly called Peraton), providing technical support for several contracts with the U.S. government. Currently, her job primarily involves modeling and simulation and technical analysis of Navy systems.

Renee Johnson first obtained her BS in physics from the University of Colorado Denver before her next accomplishments including an MS in Biomedical Forensic Sciences from Boston University and then a Doctor of Pharmacy from the University of Colorado School of Pharmacy. In Boston, after focusing on forensic toxicology, she decided to pursue a pharmacy degree to learn more about what drugs can do to the body and what the body can do to drugs. Currently, Renee is a pharmacist with King Soopers Pharmacy.

Remote guests:

Austin Appleby (bio coming soon)

Naomi Pequette is an Adjunct Professor of Astronomy at the University of Denver and the Owner of Peak Nova Solutions LLC, a science communication firm based in Colorado. Her focus is making space science engaging and accessible for people of all backgrounds and interest levels. She holds a BS in Physics with minors in Astrophysics and Mathematics from the University of Denver.

4:00 – 4:45 PM

Mark Siemens and Members of the University of Denver Society of Physics Students

Demonstration Challenge

Teams will have 20 minutes to learn a demonstration and then provide lightning presentations. Let's see what is new and different with some traditional favorites. Everyone can participate in this one, and everyone can learn something new.

4:45 PM

Adjourn, Thanks, and Safe Travels.

Thanks to:

Planning Committee:

Jasmine Andersen

Steve Iona

Faun Lee

Maren Scarborough

Nicole Schrode

Mark Siemens