

# 2021 Virtual Spring Meeting

# CO/WY AAPT

Connecting Teachers in a Physically-Distant World

## Presentation Abstracts

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**9:00 AM** “Mindfulness & Empathy in the Science Classroom” (invited workshop)

*Nadene Klein (Daniel C. Oakes High School)*

For some students, science is a high stress class, especially when math is involved. It can be for the teacher too. This workshop will share some strategies to use mindfulness and elicit empathy from students that can be interwoven in the science classroom. The goal is to help reduce stress and refocus your class.

**9:55 AM** “#LeadershipGoals” (30-min workshop)

*Nicole Schrode (SVVSD and PEER Physics) & Shannon Wachowski (Science & CTE Consultant at the Wyoming Department of Education and PEER Physics)*

What are your #LeadershipGoals? All teachers are leaders: in their classroom, school, district, and personal life. In this 30-minute workshop, participants will reflect on how they envision themselves as a leader, engage with a self-evaluation tool, and develop an action plan for making change in their leadership life. In anticipation of the soon-to-be-published guide *Honoring Teachers as Professionals: A Handbook for Creating Change in Your Classroom and Beyond*, through AIP Publishing, the authors will walk novice and experienced teachers through some of the leadership and goal setting resources found in the book.

**11:00 AM** “A Question of Modalities” (15-min talk)

*Suzanne Taylor (Western Colorado University)*

The restrictions imposed during the coronavirus pandemic, while challenging, have provided a unique opportunity for educators to break out of old teaching habits and try new approaches to teaching in a relatively low-risk environment. During the last year, I have transitioned from teaching introductory astronomy and college physics classes fully in-person, to offering flipped in-person, synchronous online, and asynchronous online modalities. In this talk I will discuss lessons learned and compare student learning within the different class structures.

**11:15 AM “STeLLA: Science Teacher Learning from Lesson Analysis”** (invited workshop)

*Connie Hvidsten (BCSC, Colorado Springs)*

In this session, we will explore the power of video analysis to improve teachers’ understanding of strategies that deepen student understanding and critical reasoning. The STeLLA program has been researched for more than 15 years and been shown to improve both teaching practice and student learning. Participants will be introduced to a library of video resources that can be used by school science departments, school coaches, district PD providers, universities and others involved in improving physics instruction.

**12:50 PM “What the heck is that?”** (discussion forum)

*Courtney Willis (University of Northern Colorado, Emeritus Professor)*

In this session, learn how an inertial balance measures the inertial mass, what is a slide rule and how to use it, how Helmholtz resonators works, what is the Thornton apparatus collecting dust in your lab storage, and what the heck are vacuum tubes and what do they have to do with radio waves.

**1:00 PM “Raising the Bar in an Alternative Setting”** (15-min talk)

*Nadene Klein (Daniel C. Oakes High School)*

As a teacher in an alternative high school, I've learned a few tricks of the trade that I will share with you to help you motivate, assess, and raise the bar for your at-risk students and reluctant learners. Materials will be given to you; recorded student testimonials will be shared; and there may be opportunities to share experiences and brainstorm together via a Q&A time. This session is applicable to educators of all experience levels who work with at-risk youth or reluctant learners.

**1:15 PM “Exploring the Details of Rainbow Formation Using GeoGebra”** (3-min video talk)

*David Chandler (Retired, Math Without Borders)*

GeoGebra is a powerful, free dynamic graphics tool available for free from <http://GeoGebra.org>. I have created a number of demonstrations that allow for the exploration of rainbow formation, both from the droplet perspective and the distribution of droplets in the sky. These demonstrations allow you to explore and explain the diverse phenomena in a rainbow often overlooked: the bright interior, the clear red but washed-out violet end of the spectrum in the primary bow, the reversed secondary bow, the dark band of sky between the primary and secondary bows, etc. (I can make the code for these GeoGebra demonstrations available to anyone interested.)

**1:20 PM “Sensor Cart Physics”** (3-min video talk)

*Roger Larson*

Presenting samples from a new book available from Vernier Software and Technology that exclusively uses the Vernier Go Direct Sensor Cart with 21 investigations studying Kinematics, Newton’s Laws of Motion, Forces and the Conservations Laws. Student data and teacher analysis Graphical Analysis files are included. Also coming this month are Graphical Analysis Pro data files that include the new synced video and data feature unique to GA Pro. For more information visit [Vernier.com](http://Vernier.com)

**1:25 PM “Where do heavy R-process elements come from?” (3-min video talk)**

*Caroline Leach (University of Denver)*

The LIGO-Virgo Interferometer network has detected Gravitational Waves (GW), implying compact object mergers such as black holes (BH) and neutron stars (NS). Binary Black Hole (BBH) mergers are the most extreme of such events. Compact object mergers have sufficiently high energy density to break up existing nuclei, releasing large numbers of protons and neutrons, powering the additive R-process, or the rapid neutron capture process, to produce heavy elements. This report focuses on the detection of BBH mergers and the theoretical consequences that predict heavy element production for comparisons with observed elemental abundances.

**1:30 PM “Galactic black holes and the 2020 Nobel Prize in Physics” (invited talk)**

*Mariana Lazarova (University of Northern Colorado)*

I will shed some light on galactic supermassive black holes (they are black holes, so I hope you don't expect any light coming back!) and the 2020 Nobel prize in Physics, particularly highlighting Dr. Andrea Ghez – only the fourth woman to win the prize – and her work on the black hole in the center of the Milky Way.

**2:00 PM “Teaching Waves with PEER Physics Open Source Resources for General Physics”**

(45-min workshop)

*Emily Quinty & Shelly Belleau (PEER Physics at University of Colorado Boulder)*

In this interactive workshop, participants will engage with the PEER Physics Waves unit. PEER Physics offers a suite of curricular resources, professional learning, and teacher networks, specifically geared toward the high school general physics classroom and enacting NGSS ideals. We are releasing open source (FREE!) materials for teaching waves, aligned with the NGSS. Dive into these new resources while considering ways of supporting students with the process of building claims from evidence. Participants will engage with student work to ultimately characterize the classroom conditions necessary for students to build claims and develop models from evidence. Participants will discuss their roles in helping students integrate physics content and scientific practices as they develop models, explanations, and principles that explain the physical world.

**2:50 PM “Effective traditional and virtual education outreach” (invited talk)**

*Brian Jones (Little Shop of Physics, Colorado State University)*

Insights about effective traditional and virtual education outreach as gained from the success of the Little Shop of Physics.

**3:45 PM “DIY @ Home Demo Show” (demo show and discussion)**

*Mariana Lazarova (UNC)*

I will share a large collection of short demos I have been recording at home during the pandemic, with focus on the physics in our everyday life. See with your eyes how rainbows form in water droplets, why is the sky blue, what is the ring you see when your glasses get foggy, and many more. I will share the google drive folder with all the demo videos for classroom use.