

Session Topics for the 2022 AAPT Summer Meeting
(session topics are not final and subject to change)

Panels and Topical Discussions

Early Career Topical Discussion

Postdocs, new faculty, and other junior Physics Education Research (PER) members are invited to this topical discussion to meet and discuss common issues. As this stage in a career can be a period of significant transition, we are hoping to provide a space to facilitate community building, resources, and professional development for those starting a career in PER. The session format will be an open discussion about identifying what are the needs of early career members in the community, how can we plan strategies to address those needs, and how to build the support structures for that community. We will ask participants to discuss these topics in small groups first, then share those ideas with the room.

I Teach Physics and...

This session is for teachers to give insight on their courses that they teach outside of a traditional physics sequence. For example, courses like environmental science, chemistry, biology, etc.

Life Beyond Physics

What do retired physicists do with their time? And does thinking like a physicist help with other activities? Five "retired" but still very active physicists will discuss what life is like beyond a physics-teaching career.

Modern Eddington Experiment 2024

The Modern Eddington Experiment was successfully performed during the 2017 total eclipse by Portland Community College (PCC) students in Oregon under the guidance of Richard Berry at his Alpaca Farm Observatory. The second successful attempt in 2017 was performed by Don Bruns in Wyoming, and his success was the most accurate Eddington Experiment ever performed yielding the Einstein Coefficient of 1.75 exactly with an error of 3%. Now, PCC's Toby Dittrich is organizing an attempt in Mexico during the upcoming April 2024 eclipse which will potentially gather thousands of data points instead of the usual tens of data points. With the potential of having as many as twelve telescope stations, each gathering images of 1000 stars, the 2024 experiment could become one of its own in the front of the list of historic Eddington Experiments. Now, there is plenty of time for you to join in this effort to involve your students in the measurement of the curvature of space. This Topical Session will discuss what is needed in terms of equipment and procedures, so that our world class experts Richard Berry and Don Bruns can assist us in this execution of the Modern Eddington Experiment. PCC now has acquired four telescopic stations for use and there is room at the fabulous site in Mexico, exactly on centerline at the point of maximum

Pandemic Reflections

Discussion on challenges and successes within teaching during COVID.

Professional Skills for Students

This interactive panel focuses on developing professional skills for graduate students and other early-stage researchers.

The International Conference on Women in Physics

Panelists will share stories and successes from the recent International Conference on Women in Physics (ICWIP), held virtually in July 2021. These conferences are held every three years and are sponsored by the International Union of Pure and Applied Physics. Delegates from the US were part of poster sessions and workshops, and were able to listen to multiple plenary speakers from around the world. ICWIP draws approximately 200 people, primarily women, from over 60 countries and helps promote women in physics and sharing their struggles and successes.

Methods of Remediation in the Intro Physics Classroom

This session is a discussion on the various remediation processes that people use in their classrooms. This can be for labs, tests, quizzes, or even smaller tasks. The goal of sharing these strategies is to see: how do people encourage their students to pursue further growth in their physics knowledge.

eclipse, for eight more stations. I hope you can join in this exciting and historic effort to promote the use of the Eddington Experiment in the Advanced Lab curriculum at many colleges/universities in the future.

Invited/Contributed Sessions

21st Century Physics in the Classroom

The 21st century continues to be an exciting time in physics, yet students in introductory physics courses often encounter only discoveries made before the mid-20th century. During this session, participants will learn how to engage their students in activities that open up to them the world of today's physics research.

Adaptive Physics Contest Preparation Applying Data Science Elements

In the 21st century, Data Science provides effective methods and tools in education to improve social and emotional skills, measure student and instructor performance, innovate curricula. During this session, participants will learn the advantages of adaptive solutions supported by Data Science applications in the physics classroom, especially the enhanced evaluation of students who prepare for physics contests.

Apparatus @Home

Speakers share how they and their students used materials at home and local venues to conduct experiments and demonstrations to teach physics.

Being a Student-Ready Physics Class

We all know not all our physics students are college-ready. There's nothing wrong with that! But, how can we make our physics courses equitable and student-ready? How can we support our students, starting from where they are at, so that all students can succeed? Do you have a strategy, activity, or technique that supports student success? That helps to motivate them? Come share it with us in this session

Best Practices in Educational Technology

This session invites contributions focused on effective technologies for physics education, especially those developed during the pandemic, that have promise for incorporation into remote, blended, or face-to-face teaching and learning.

Building a Bridge from Intro to the Major

How do you help prepare students to move from the introductory physics course into the major? Do you have strategies to help retain students in the major: a mathematical methods course, peer mentors, a laboratory course, etc. Have you revised your course sequence and/or requirements to try to address these issues? Have you made changes within a sophomore level course for this purpose? Share what you have learned so we can all do a better job recruiting and retaining students who express an interest in majoring in physics.

Building a Quantum Information Science and Engineering Curriculum for a Diverse Community of Learners

With the growing prevalence of quantum computing, there is a need to prepare a diverse group of students for this next quantum revolution. Have you done something in your courses to inspire and educate a wide population? Please share things you have tried working with learners at all level, as part of a class or as outreach for K12, undergraduate, graduate level, or for the general public.

Challenges Facing Women in Physics (AIP Report)

Women remain underrepresented in Physics to this day. Women physicists face many challenges and barriers during their educational and professional careers. In this session, the speakers will discuss these challenges and barriers.

Chaotic Laboratories and Apparatus

Chaos can be hard to fit into a lab and even harder to find an example that is simple enough to explain and take data for. The objective of this session is to discuss chaos laboratories and apparatus. The laboratories can be for first year or beyond and can be mechanical, electrical, or simulations in nature. Along with the laboratories, any chaos lecture demos would be a good fit.

Computation and Modeling to Non-science Majors

Computation and modeling are part of many physicists' standard daily routine in their professional life. The physics community has by and large also embraced integration of computation into the physics curriculum as evidenced by the popularity and success of the PICUP project (<http://www.gopicup.org/>). Physicists have a lot to offer when it

comes to computation and modeling outside the realm of physics in general education where computational thinking and modeling are increasingly being emphasized. This session will focus on the use of computation and modeling in STEM courses, especially the ones geared toward non-science majors. It consists of invited talks and welcomes contributed talks discussing experiences, tools and techniques, and best practices on computation in a broad sense implemented to support defined learning outcomes.

Diversity, Equity, and Inclusion: Physics Education and Identities

The Committee of Diversity in Physics (CoDP) invites you to submit an abstract for contributed talk on identities in physics and explorations of growth, development, and experience for diverse populations. Work exploring and considering identity in physics is important for diversity and inclusion in physics. This is not a session to only share research- we strongly encourage physics and science educators to share promising practices that support and celebrate the diversity in our physics learning spaces.

Diversity, Equity, and Inclusion in K-12

The Committee of Diversity in Physics (CoDP) invites you to submit an abstract for a contributed talk on diversity and inclusion work in the K-12 space. The past 5 years, especially through the pandemic, has allowed us to reflect on the ways we need to show up for ourselves, our students, and our classrooms to address our biases, ways to practice inclusion, and the importance of its impact on marginalized populations in physics. We welcome abstracts from practitioners on professional development, learning spaces and curriculum changes, as well as student measures and experiences of equity and inclusion

Diversity, Equity, and Inclusion: Theoretical Frameworks and Methodologies

The Committee of Diversity in Physics (CoDP) invites you to submit an abstract for a contributed talk on quantitative, qualitative and mixed methods that are novel and meaningful methods that challenge physics education research. Presentations on theoretical frameworks that also challenge and change the way we can analyze, and interpret the complex stories of diverse populations in physics.

Diversifying Through Connections at TYCs

The student, staff, and faculty populations at two-year colleges (TYCs) are extremely diverse on a variety of axes. This session looks at data that showcases the diversity at TYCs, and the ways in which we can be more inclusive, and more supportive of such diverse populations.

High Altitude Ballooning

This session is seeking presentations that involve high altitude balloons (HAB's) as a part of collaborative research experiences with students, or as a part of a classroom lesson, or for their use in outreach. Technology in this extreme environment is tasked significantly and we would like to highlight testing and instrumentation work using HABs. We also encourage presentations discussing HAB technology preparations for measurement of tropospheric and stratospheric changes occurring during the upcoming 2023 annular and 2024 total solar eclipses.

Inclusive Science Communication

Communicating science to the public remains challenging. However, it is becoming increasingly critical to be able to communicate not only the results of science but the limits and promise of our disciplines. But how do you address diverse populations in an inclusive way? Papers are invited on various aspects of inclusive science communication.

Innovations in Teaching Astronomy

What are you doing in your astronomy classes, whether high school, introductory, or advanced undergraduate, to teach in an innovative manner? How do you engage students in the learning process? What are you doing to move beyond the traditional lecture approaches to incorporate aspects of active learning? This session will include both invited and contributed talks around innovations in teaching astronomy at all levels, and we welcome your submissions.

Interactive Lecture Demonstrations: A Research-Validated Strategy to Improve Learning in Introductory Physics

This interactive session will demonstrate Interactive Lecture Demonstrations (ILDs), a research-validated active learning strategy for the lecture portion of the introductory course that engages students to take an active part in their learning. ILDs have also been used successfully in high schools. Attendees will be introduced to ILDs in different areas of physics, through active audience participation, and will receive access to the book Interactive Lecture Demonstrations, containing ILDs on 28 topics from the introductory course. Information on Home-Adapted ILDs, designed for students to work on virtually at home, will also be presented.

Call for papers: Papers on implementations of or innovations with Interactive Lecture Demonstrations are invited.

Make, Play, Do and Learn

Do you have a low cost, easy to make item that uses readily available materials? Do you want to support K-12 education? Create a document or item you are sharing during this session. Include the materials needed, the instructions to make the item, a picture of a completed item and links to the NGSS in your document. (If you don't know what the NGSS are, please contact your local PTRA or Mark Hannum at the AAPT office.) Please bring materials with you for others to use to make your item and be available to support the people who come by your table.

Contributed papers on use or development of Interactive Lecture Demonstrations are welcome.

Outreach through Social Media

Physicists are active on a variety of social media platforms to share what they are doing with each other and to engage with students and the public. How do you use Twitter, Tik Tok, YouTube, Instagram, LinkedIn, or another platform to communicate physics or connect with the physics community, the public, or your students? What are the benefits and challenges? How has social media impacted your reach and ability to connect with various groups? This is an opportunity for you to share your social media use and experiences with others in person (hopefully).

Physics Education Research in the K-12 Classroom

If you study the learning of physics concepts by K-12 students, please submit an abstract for this session.

Physics Teaching Around the World

Physics teaching from non-US perspectives and settings.

Pulsars and Radio Astronomy

Have you engaged your students in conducting research in radio astronomy, or used radio astronomy as a demonstration of how astronomy research can be carried out? We welcome contributed papers in topics on radio astronomy, especially the participation of high school and undergraduate physics students in the study of transient radio phenomena like pulsars.

Quantum in the High School Classroom

Teaching quantum concepts in the high school classroom can be both challenging and rewarding. Speakers in this session will give insight as to what is being done and how students are responding to the challenge of QIS.

Short Course Experiences: The Good, The Bad, And the Ugly

Share your experience with short term, compressed, accelerated, etc. physics, astronomy, or physical science courses. What are the unique challenges? What are the advantages or disadvantages? Are these courses a good fit for you and/or your students? Share your experiences with a presentation in this contributed session.

Smart Phone-Based Labs

This contributed session will be focused all aspects of labs based on the use of smartphones. We welcome descriptions of labs using smartphone sensors, smartphones for analysis, smartphones to access simulations, and other smartphone-based experiences.

Sports meets Physics

"Biomechanics, Motion Tracking, High-Tech Sportswear and Equipment - there are abundant connections between physics and sports. Professional athletes are very aware of this connection: it helps them to squeeze decisive seconds out of their performance, that can make the difference between victory and defeat. And even the technology to measure this difference is built upon laws of physics. In everyday life, conscious control of the body gives us a secure stance and protection from falling accidents. Making connections between physics and sports in your lesson is inspiring and opens physics for a different type of learner. From a neuroscience perspective, linking physics knowledge to body movement can lead to a very persistent learning that is re-activated every time the movement is performed. We will analyze several examples where physics learning is connected to sports. Insights from the sports area will be provided by Martial Arts Expert, Keynote Speaker and Author Thommy Luke Boehlig. What are your experiences connecting physics and sports in education? Please consider a contribution to this session. Either virtual or in presence, we will provide several opportunities to connect sports and physics hands-on!"

SPS Undergraduate Posters

The Society of Physics Students (SPS) invites undergraduate students to share their research work or outreach efforts in poster format.

Supporting Physics Teaching with a Planetarium

We welcome contributed talks for this session. Presenters will be using a portable planetarium (Digitalis) and its projector. Length: 15 minutes, about "Using a Planetarium to Teach Physics and/or Astronomy Concepts".

Teaching & Supporting Future Teachers Using Next Gen PET (Posters)

In this session we will explore the NextGen Pet curriculum and share how faculty are working together as a community in its implementation in a FOLC (Faculty Online Learning Community). This curriculum is well-suited for pre-service elementary school teachers and for non-science majors completing their general education requirement in physical science. This session will be of interest for those wishing to hear of others' implementation experiences for such a course and/or finding out about the successes of the NextGen PET FOLC itself.

The Many Roles of Smart Phones in Online Education

This contributed session will explore the full range of smartphone applications in online education. Before, during and after (we hope soon) the COVID-19 pandemic, smartphones have played and will play a wide variety of roles in online education. This raises an equally wide range of issues for faculty. How can smartphones best be used? What apps can enhance students' learning? How can we address the needs of students who do not have a smartphone? How can we address the equity issues related to students who rely on a smartphone as their only internet-capable device?

Training Learning Assistants and Graduate students to be effective Lab Assistants

Many faculties have put significant time into creating labs that are interesting, instructive, and follow education research results. But in many physics departments, graduate TAs are the ones doing the hands-on instruction of the undergraduate students. This session will discuss how different faculty train their graduate students to be effective TAs in the laboratory setting, so that the labs can reach their full potential.

Using Desmos in the HS Physics Classroom

This is a Learn and Design session in which teachers will hear from 2-4 invited and contributing presenters about a few ways they could use Desmos in their physics classrooms. Presenters will speak for 15 minutes (or less) about Desmos and show examples of its use in their classrooms. Teachers will then spend the remaining time working with Desmos to design or adapt their own labs and lessons using the tool. Presenters, and other helpers familiar with Desmos, will then circulate the room and provide pointers, help folks remember how to use certain features, and otherwise support teachers as they learn. Teachers can share what they worked on with others to spur further ideas and help people make connections with other teachers using Desmos.