

Fall 2022 TSAAPT WORKSHOPS

Rice University
October 14 – 15, 2022

FRIDAY AM

W1 “Alternatives or Inexpensive Ways to Show Physics Concepts”, presented by Stephanie Ingle and Regina Barrera, Lee College, Baytown, TX

Do you have ways of showing or engaging Physics Concepts that is a must see? Why don't you bring it with you and show it to us? Are you scratching your head trying to figure out how to engage your students? Join us. You may come out of this workshop with ideas that may help you in your instruction. I will bring some items that I use for outreach and recruiting. One of the items we will make is the Spectroscope. It is a kaleidoscope that uses hatch gratings with tape, paper tubes, paper clips, and rubber bands. Another is a demonstration of alternating current or the fingerprint of a gas. It just uses a neon bulb, power cord, and a toy. These ideas and much more will be illustrated (and some make and take) in this workshop. Again, if you have something that demonstrates a concept in Physics, please bring it to share with us! Let us build a network for exchanging ideas to engage students.

Limited to 18 participants – 2.0 hours – Cost: \$5.00

FRIDAY PM

W2 “Inquiry Laboratory Investigations in Physics”, presented by Janie Head, Lamar Consolidated ISD, Richmond, TX.

Teachers will conduct inquiry investigations covering the following topics:

- 2-D motion
- Compare linear and circular motion
- Momentum
- Construct the tallest tower which will support a 250-gram object.

This workshop is supported in part by a Bauder Fund Grant from the American Association of Physics Teachers.

Limited to 24 participants – 1.5 hours – Cost \$5.00

W3 “Using WebVPython in Your Physics Program”, presented by Tom O’Kuma, Lee College

Over the last few years, there has been a push to integrate computational modeling into the introductory physics curriculum. This is a workshop for novice coding learners, where participants will learn basic steps in WebVPython (also known as GlowScript) and practice with codes that demonstrate physics principles ranging from conceptual to calculus-based level. Participants will practice with activities that could be directly integrated into the classroom, starting with kinematics where physical modelling will be incrementally added through guided steps. Participants are asked to bring their own laptops and to create an account in webvpython.org before arrival. **This workshop is sponsored jointly by the OPTYCs Project, the Quantum for All Project, and the PTRA Program.**

Limited to 18 participants – 1.5 hours – Cost \$5.00

W4 “Engineering Design and 3D Printers”, presented by Ryan Piwetz, Port Aransas High School, Meghan DiBacco, Cinco Ranch High School (Katy), Kenric Davies, Liberty High School (Frisco), and Tom O’Kuma, Lee College (Baytown)

Do you want to do projects in your physics course? Utilizing 3D printers, one can use engineering design to create projects for students to design and build various objects. In this workshop, we will go through the engineering design process, learn to use TinkerCAD to design objects, and then learn how to print your designed objects on a 3D printer. Participants should bring a laptop to load the necessary software to use in the

workshop. **This workshop is sponsored jointly by the Quantum for All Project, the OPTYCs Project, and the PTRA Program.**

Limited to 15 participants – 2.0 hours – Cost: \$5.00

SATURDAY AM

W5 “Polarization and Malus’ Law Workshop” presented by Tom O’Kuma and Regina Barrera, Lee College, Baytown TX

Interested in teaching your students about polarization and Malus’ Law? In this workshop, you will build a polariscope and learn fascinating information about polarization. You will also do a lab activity involving polarization and Malus’ Law. If we have time, we will lead you through the creation of a computer simulation to do polarization and Malus’ Law. **This workshop is sponsored jointly by the OPTYCs Project, the Quantum for All Project, and the PTRA Program.**

Limited to 24 participants – 2.0 hours – Cost \$5.00

W6 “Radioactivity Workshop for HS Teachers” presented by Daniel Marble, Tarleton State University and Chris Marble and Kassie Marble, Texas A&M University

Interested in teaching your students about radioactivity? Want your students to perform activities that are analogous to ^{99m}Tc bone scans and PET scans? Want your students to measure the rest energy of an electron to an accuracy of a few percent using gamma rays? Curious how physicists at CERN use coincidence techniques to sort through the billions of possible events to find something interesting like a Higgs event. In that case, this workshop is for you.

The Physics program at Tarleton State University has been offering hands-on nuclear physics activities to high school students as part of our two-week residential summer camps for several years using the equipment in our accelerator laboratory. We have modified many of these activities so that they now can be performed at your high school using new low-cost spectroscopy systems. During this workshop, teachers will be taught how to setup a low-cost spectroscopy system and perform a series of hands-on activities including measuring both the rest energy and charge of an electron and measuring the half-life of a short-lived isotope. Some other experiments include verifying the $1/r^2$ dependence of a radioactive point source, measuring the mass attenuation coefficient for gamma ray shielding, and using coincidence detection to verify the 180-degree emission of annihilation photons from electron-positron annihilation.

Each workshop participant will be given writeups to all the activities with additional teacher materials to guide class discussions and the activities relevance to important industrial and medical physics applications. Participants completing the workshop will keep the \$2,000+ of materials they use to perform the workshop activities including the spectroscopy system and radioactive sources so they can do these activities with the students at their high school due to financial support of our sponsor the Nuclear Power Institute. **This workshop is sponsored by the Nuclear Power Institute and the Texas Section of the AAPT.**

Limited to 8 participants – 5.0 hours – Cost \$2.00

SATURDAY PM

W7 “WebVPython and Malus’ Law Workshop” presented by Tom O’Kuma and Regina Barrera, Lee College, Baytown TX

Interested in teaching your students about computational modeling and Malus’ Law? In this second WebVPython workshop, we will lead you in creating a computer simulation to do polarization and Malus’ Law. You will be introduced to the slider control function in doing this. **This workshop is sponsored jointly by the Quantum for All Project, the OPTYCs Project, and the PTRA Program.**

Limited to 18 participants – 2.0 hours – Cost \$5.00