Spring 2020 TSAAPT/SPS WORKSHOPS

Lamar University - April 3 – 4, 2020

Workshop Fee is $10 for workshops whether 1 or more workshops. Only 1 workshop per time block. CPE credit available for each workshop.

FRIDAY AM

W1 **"Multi-Based Labs – Smart Devices",** presented by Regina Barrera and Tom O'Kuma, Lee College, Baytown, TX

This workshop will focus on using Bluetooth sensors and Bluetooth devices such as tablets, computer, or mobile. It will concentrate on using a cart that gives many possibilities in lab. The cart has an Encoder wheel that sends position, a 3-axis accelerometer to measure independent acceleration, a force sensor to measure push and pulls, a plunger that can be used for collision and impulse, it hes minimal friction, and magnetic bumpers. We will display different setups of the apparatus that you can use in your lab. If there is time, we may also show circuits, magnetism, and light.

Limited to 18 participants – 1.5 hours

Friday, April 3 – 10:30 AM – 12:00 PM

FRIDAY PM

W2 **"Computational Modeling for Introductory Courses",** presented by Tom O'Kuma, Regina Barrera, and Stephanie Ingle, Lee College, Baytown, TX.

In this workshop, participants will learn how to use Glowscript to have their students learn and use computational modeling in introductory physics courses. Glowscript (www.glowscript.org) is a free, web browser based language that you and students can do on a computer, tablet, or smartphone. **Electricity and Magnetism examples will be emphasized**. Although computers will be available during the workshop, participants are encouraged to bring their own computers to use and to establish their own Glowscript folder. Class handouts and examples of student work will be shown.

Limited to 18 participants – 2.0 hours

Friday, April 3 – 2:30 PM – 4:30 PM

SATURDAY AM

W3 **"How to use College Physics: Explore and Apply to help your students learn physics, learn to think like scientists, and to develop confidence in themselves"** presented by Eugenia Etkina, Rutgers University, New Brunswick, NJ.

In this workshop the participants will learn how to use the innovative physics textbook "College Physics: Explore and Apply" (2e) by Etkina, Planinisic and Van Heuvelen and all supporting materials to help their students learn introductory physics through practicing it. The textbook, the Active Learning Guide, the Instructor Guide and many other supplements engage students in the development of physics concepts through experimentation and reasoning, introduce them to a myriad of original representations that help bridge phenomena and mathematics, and engage them in expert problem solving of traditional and non-traditional problems. The materials are not only PER- based but tested with thousands of students. They are exceptionally helpful for those who are teaching AP Physics I and II in high schools and and preparing their students for MCAT. The textbook and the ALG have lots of innovative features that the participants explore in the workshop. The users of the materials have an on-line learning community where they share their ideas, tips and issues.

Limited to 24 participants – 2.0 hours

Saturday, April 4, 10:30 AM – 12:30 PM

W4 **"PTRA: Including Quantum in your high school physics course",** presented by Karen Jo Matsler, PTRA - UT Arlington, Arlington, TX; Kenric Davies, PTRA – Liberty High School, Frisco, TX; and Trina Cannon, PTRA – Eastfield College, Dallas, TX.

Quantum computing is an exciting branch of quantum mechanics and has the prospect of making cyber security practically unbreakable. With simple hands-on demonstrations, you can bring the ideas of quantum computing and cryptography into your classroom and model the sending of a message and cipher while learning how an eavesdropper is detected.

Limited to 24 participants – 2.0 hours

Saturday, April 4 – 10:30 AM – 12:30 PM

W5 **"ALPhA Advanced Lab Workshop",** presenter by Toni Sauncy, Texas Lutheran University, Seguin, TX.

Limited to 24 participants – 3.0 hours

Saturday, April 4 – 11:00 AM – 2:00 PM

SATURDAY PM

W6 **"PTRA: Black Holes and the M87 Images",** presented by Ryan Piwetz, PTRA – Port Aransas HS, Port Aransas, TX and Stacy Gwartney, PTRA – Tyler ISD, Tyler, TX.

In April of 2019, the Event Horizon Telescope (EHT) collaboration released photos of Messier 87. With the scientific community thrilled at the news, many high school students were asking questions that many of us could not answer. This session will give some background information and activities you can take back to the classroom to feed their appetite for the mysteries of space and black holes. The session will include activities to help students understand what black holes are, how they form, and gain a better understanding of the technical challenges that the EHT collaboration had to overcome to capture the amazing M87 images.

Limited to 24 participants – 1.0 hours

Saturday, April 4 – 12:45 PM – 1:45 PM

W7 **"PTRA: Making Astronomy a Lab Based Science",** presented by Kenric Davies, PTRA – Liberty HS, Frisco, TX and Tom O'Kuma, PTRA – Lee College, Baytown, TX.

Astronomy is quickly becoming a hook for students entering the field of physics which is reflected in institutions changing their departmental names to "Physics & Astronomy". In high schools, the Astronomy course has been gaining popularity since its creation during the era of the "4 x 4" graduation plan. This session introduces ways that Astronomy courses can be taught as a Lab Based Science course complete with inquiry, data logging, and physical/ virtual experimentation. Additionally, participants will get to build their own Galileoscope.

Limited to 24 participants – 1.0 hours

Saturday, April 4 – 1:45 PM – 2:45 PM