Astronomy Education Workshop

JOINT WITH BIANNUAL MEETING OF THE NEBRASKA CHAPTER OF THE AMERICAN ASSOCIATION OF PHYSICS TEACHERS

FOR HIGH SCHOOL TEACHERS AND COLLEGE INSTRUCTORS

8:30a.m. - 4:30p.m.

Saturday, October 12, 2019

Jorgensen Hall
UNL City Campus

For attendees:

- Choose four breakout sessions (30 minutes)
- Choose one of three 90-minute hands-on sessions
- Enjoy a continental breakfast, lunch, parking, and a door-prize raffle
- Bring a laptop (preferred) or tablet/smartphone

RSVP at: **go.unl.edu/astro2019**

Organized by UNL Department of Physics and Astronomy and the Center for Science, Mathematics and Computer Education.
Questions? Contact Dr. Kevin Lee: **klee@unl.edu**

PRESENTATION 1 @ 9 a.m.

Dr. Bob Hilborn

Associate Executive Officer, American Association of Physics Teachers

Gravitational Wave Polarization: Did Einstein Get it Right and Why Should We Care?

Gravitational wave (GW) detectors give us a new "telescope" to view astronomical objects and events never seen before (at least by humans). Critical to the interpretation of the properties of these GW sources is the polarization of the emitted gravitational waves. Until recently, there has been no direct evidence for the character of GW polarization. Einstein's theory of gravity (general relativity) predicts that the polarization will have a "tensor" character. Other theories predict "vector" and "scalar" forms of polarization. To-date, the most compelling data to sort out these possibilities come from the binary neutron star merger event GW170817 seen by the three LIGO-Virgo observatories. Surprisingly, the data seem to support "vector" polarization over Einstein's "tensor" polarization. In this talk, I will explain how the GW data can be used to determine the GW polarization and why we conclude that the GW170817 data strongly favor "vector" polarization. Why should we care? In the words of noted astrophysicist Clifford Will, such a conclusion "would be disastrous for general relativity."

This work has been carried out in collaboration with A. A Svidzinsky, Texas A&M University.

PRESENTATION 2 @ 1:30 p.m.

Dr. Kathryn Williamson

Teaching Assistant Professor, West Virginia University, Department of Physics

Innovating Astronomy Education with Robotic Telescopes

We are on the cusp on an astronomy education revolution. Robotic telescopes are now bringing the excitement of authentic astronomy practices and concepts to large numbers of students and educators far and wide. With internet access to a worldwide network of remotely controlled, research-quality telescopes, even the most novice student can obtain accurate position measurements of asteroids, collect and analyze images of planetary systems to test Kepler's Laws, and map the invisible universe through radio astronomy. In this talk, I will provide an overview of the Skynet Robotic Telescope Network, a collection of dozens of telescopes positioned around the world and operated out of the University of North Carolina at Chapel Hill. I will discuss how the Skynet Juniors Scholars project engages young students, including those with visual or hearing impairments, in astronomical discoveries. I also will discuss how I have used Skynet in my introductory college astronomy course, Astro 101, in both lecture and lab settings at West Virginia University. Student comments and independent project examples will show the amazing possibilities and profound impact of access to robotic telescopes and one's very own astronomical data.