

Visiting Researcher Profile



Dr. Tom Troland

Astronomer
University of Kentucky

Research Specialty: Star Formation

Bio

Dr. Tom Troland is an astronomer and a professor at the University of Kentucky Department of Physics & Astronomy. Dr. Troland received his undergraduate degree from Amherst College, he received his M.S. and Ph.D. degrees from the University of California at Berkeley. Dr. Troland's research makes use of radio telescopes to study naturally-occurring radio emission from matter in deep space. These radio telescopes look much like satellite dishes, but they are often hundreds of feet in diameter. Dr. Troland uses radio telescopes to study the material in space from which new stars and planets form. Star (and planet) formation are still occurring in our universe today. Astronomers like Dr. Troland seek a better understanding of this process because it provides insights into how the Sun and planets of the Solar System formed over four billion years ago.

In addition to his research interests, Dr. Troland has a long-standing interest in teaching and in astronomy education. He regularly teaches introductory astronomy courses at the University of Kentucky. He has participated as a presenter in numerous astronomy professional development programs for K12 teachers. He has been part of the *Journey through the Universe* program since 2001, and he frequently gives astronomy talks to school and community groups in his area.

Examples of Classroom Presentations

***Journey Through the Solar System* [Grades: 3-6]**

Modern spacecraft have provided with astonishingly detailed images of many objects in the solar system. These images tell us much about all planets except Pluto, and about many of the moons of these planets. What would it be like to stand on the surface of Mars? How would it be different from standing on the surface of Earth? What would it be like to be on the surface of Venus or to witness the volcanoes of Jupiter's moon Io? In this presentation, students will journey to several interesting

abodes in the solar system, swinging around the Sun for a close-up look first. In the process, they will see that some things on these other worlds are like things on the Earth. But many, of course, are not.

***What's Up in the Universe?* [Grades: K-12]**

The universe is *everything*—all the matter, all the space and all the energy that exists everywhere. But how is matter arranged? How big are things in the universe? What happens when objects in the universe collide with each other? Beginning with the solar system, we will progress out to the largest known systems of matter in the universe—superclusters of galaxies. Along the way, we will use ping-pong balls to help visualize these things and their sizes. We will learn, for example, why stars almost never collide, but galaxies often do so, with spectacular results.

***The Time Machine of Astronomy* [Grades: 6-12]**

H. G. Wells wrote *The Time Machine*, and he envisioned a device that could take us back to earlier epochs of history. Astronomers have such a time machine—the travel time of light through the universe. When astronomers look at very distant objects, they see them as they were a very long time ago. The time machine in astronomy tells us much about the nature of the universe when it was billions of years younger than it is today.

***A Journey to the World's Largest Telescope* [Grades: K-12]**

The Arecibo radio telescope, located on the island of Puerto Rico, is the largest telescope in the world. In fact, it is larger than all other telescopes combined. This telescope consists of a metal bowl 1,000 feet in diameter. It functions something like a satellite dish on a giant scale. What is it like to visit this telescope? What is it like to stand 500 feet above its surface? What is it like to walk beneath the surface among a forest of ferns that hold the soil against the erosion of tropical rain?

Examples of Family/Public Program Presentations

A Journey to the Outer Planets

What would it be like to stand and walk on the surface of Mars? What would you see if you could fly close to the giant planet Jupiter, swooping close to its swirling clouds and right past its exotic moons? What would it be like to swing past Saturn and see its rings up close? Spectacular images from NASA's spacecraft now provide the answers. Until very recently, such a journey could only be imagined in the minds of astronomers, artists and science fiction enthusiasts. Now we know what such a journey would really be like.