



# ORION Trapezium

February 2018

Volume 45, Issue 2

## Who are we?

ORION was founded in April 1974, by a group of scientists at the United States Department of Energy facilities in Oak Ridge, Tennessee. Our original goal was to perform correlated, instrumented observations of atmospheric and astrophysical phenomena. Since then, we have expanded in many directions, including optical and radio astronomy and instrument design. Have a look at <https://orioninc.org> and <https://orionastronomy.wordpress.com/meetings/upcoming-meetings/>

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## Future Events

### ORION Meeting

**Wednesday, February 21**  
Goff Health Sciences &  
Technology Bldg., Room 104  
Roane State Community College  
Oak Ridge

### TAO Public Stargazes

Saturday, March 3, 2018  
Saturday, March 17, 2018  
Roane State Community College  
Tamke-Allan Observatory (TAO)  
7:30 pm to 12:00 am  
8:00 pm program  
Look at  
<http://www.roanestate.edu/obs/>

### TAO Notes

ORION people are invited to arrive early (if announced on email) to prepare for evening viewing. Bring a telescope, red flashlight and munchies.  
First time visitors – drive out before dark. Map available at  
[www.roanestate.edu/obs.visit.htm](http://www.roanestate.edu/obs.visit.htm)

## February 2018 Meeting

Wednesday, February 21, 7 PM, Goff Health Sciences and Technology Building, Room 104, Roane State Community College, Oak Ridge

### Presentation #1: *Glass Plates on Glass Ceilings: The Harvard Computers*

#### Speaker: Jennifer Hartwig

Jennifer Hartwig is an Exercise Physiologist by trade, but an amateur astronomer at heart. Currently, she works as an academic advisor for the Mechanical, Aerospace and Biomedical Engineering department at the University of Tennessee, Knoxville. She is a former instructor of Kinesiology at both the University of Tennessee and Carson Newman University, and has found that her studies of physiology, astronomy and physics complement each other in a somewhat unexpected – but much welcomed – fashion. She works with two local astronomy clubs as often as possible participating in public outreach events; has a strong interest in promoting the love of science and astronomy to children and adults; and recently served as a middle-school Science Olympiad coach in the astronomy event.

Jennifer has been our ORION Vice President and has found most of our speakers for the past year! Thanks to Jennifer!!



#### Abstract

February 11, 2018 marked the third celebration of the International Day of Women and Girls in Science. With data from multiple sources showing that the percentage of bachelor's degrees awarded to men in a STEM related field is double that of women, one has to ask the question 'why'? The intellectual capability is the same and some will point to studies that indicate that the discipline of women is better. There is some evidence that part of the problem may relate to a lack of female role models in STEM-related fields as well as a reduced rate of exposure to STEM-related career options during a young girl's formative years. Women have been making large contributions to science for millennia, but many people have never heard of them or their stories. As amateur (and some non-amateur) astronomers, we need to be more well-versed in the role that these women played. This presentation will focus on the contribution of several women at the Harvard Observatory in the early 1900's who provided solid ground work in the realm of stellar classification. They performed calculations on over half a million 8x10 glass plates, each of which contained the negative image of a small slice of the entire night sky. It is upon this work that many other scientific ideas were founded (i.e., the Hertzsprung - Russell diagram), most of which are still extremely important to our understanding of the universe today. Is there a glass ceiling in astronomy? In science in general? Come and listen to the science that these women used to crack whatever glass ceiling was there. *"Don't ever let anyone turn your sky into a ceiling."* I wish I knew who to attribute that quote to (it certainly wasn't me). Young girls, listen up: take away the notion of a glass ceiling. The sky is the limit, not a ceiling (real or imaginary).

## **Presentation #2: *The Great American Solar Eclipse at Fort Loudoun Park***

**Speaker: Lauren Baghetti**

### **Biography**

Lauren Baghetti is a park ranger for Tennessee State Parks. She attended East Tennessee State University where she earned a B.S. in Park and Recreation Management and a minor in Appalachian Studies. Lauren has worked at Roan Mountain, Norris Dam, and Fort Loudoun State Parks. Lauren leads interpretive hikes and programs to hundreds of visiting school children as well as classrooms across the state, country, and world by means of Skype. She is responsible for natural resource management projects like maintaining hiking trails, invasive species removal, and the recycling program. She is also responsible for bringing kayaks to the park. Lauren has organized several large programs and events including Tennessee State Park's 75th Anniversary in 2012, Jr. Ranger Camp, Swing Dancing at the Dam, and in 2017 she assisted with the Great Solar Eclipse event. Lauren also has great taste in socks.



### **Abstract**

The total solar eclipse that passed through on August 21, 2017 once again put Fort Loudoun on the map. Fort Loudoun was first on the national scene in 1760 during the French and Indian War when it was "forsaken by God and man." However, this time Fort Loudoun was not forsaken and certainly not forgotten.

This brief presentation will highlight the Great American Eclipse and how it impacted Fort Loudoun State Historic Park. For most who witnessed it, or rather experienced it, it was truly a once in a life time event. It was an event of such magnitude it is unlikely the park will have an experience such as this again in the near future. Without the help of numerous volunteers from across the region, the day could not have gone as smoothly as it did. For those, this presentation is dedicated to them and the love they have of the sky and the people beneath it.

## January 2018 Meeting

Dave McCallister rose above an incipient respiratory virus to give a very informative description of astronomy education at the University of Tennessee, including astronomy-related research and his own research in Young Solar Analogs.

### Biography

Dave McCallister is a graduate student at the University of Tennessee Knoxville, pursuing a Master's degree in Astrophysics. He has over a decade of experience in education and public outreach, in both formal classroom roles and informal settings like planetariums and star parties. He has been interested in science since he was seven, when his grandfather pointed his telescope toward a crescent Venus in the dark West Virginia skies. He taught high school physics in northern Kentucky for several years before moving to Knoxville with his wife Sarah. He has a B.A. in Physics from Northern Kentucky University and a Master of Arts in Teaching from Thomas More College. Dave is an Astronomy Ambassador designated by the American Astronomical Society, and has been awarded the Wayne Kincaid Award and the Robert W. Lide Citation by the UT Physics and Astronomy Department for service to the astronomy laboratory and outreach programs. When not huddled up with a telescope under a dark sky, he enjoys baseball, visiting his nieces and nephews, and travelling with his understanding and lovely wife.



Dave frequently visits Tamke-Allan Observatory, bringing along one of his telescopes and enjoying the stars with us.

### Abstract

The University of Tennessee Department of Physics and Astronomy does not have a pure astronomy major, nor any full professors researching observational astronomy. Despite this, the topic is popular among undergraduates, with the introductory survey lectures at capacity once again this semester and the recent creation of a student-run astronomy club. We will discuss the department's course offerings as well as the academic requirements for the astronomy concentration in the physics major. We will also examine the various astrophysics-related research groups (including my own research on Young Solar Analogs), the astronomy facilities and equipment used, as well as the education and public outreach activities of the department.

### There's a new cool Kid in Space

In case you ORION folks missed it, there is a New Cool Kid in Space. This is good news for the future of astronomy.

The new kid dresses in white and drives a red sports coupe that cruises at 7 miles/second (about 25,200 MPH). He apparently knows lots of rich folks, since his car (a Tesla) is pricey.

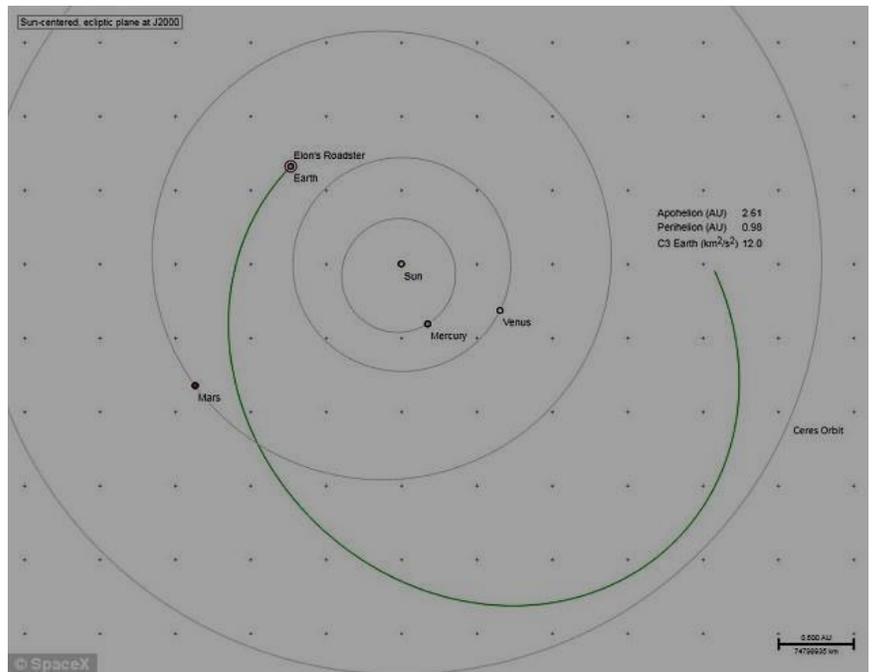
Here is a recent photo showing the Kid with his car, contributed by Elon Musk to show the power of his Falcon Heavy rocket.

Yes, that's the earth in the background in the top photo.



The Cool Kid will be about 5 million miles away from space by Wednesday evening when you'll hopefully cruise down to the ORION meeting.

The Cool Kid is cruising toward asteroid Ceres, as shown in the orbital diagram in the lower graphic.





The red coupe was launched using 3 Falcon rockets manufactured by SpaceX, Elon Musk's company.

The set of 3 Rockets weighs 140,000 pounds (63,000 KG) and is the largest launch system currently in production (see bottom graphic).

The purpose of the Falcon Heavy was to serve as a vehicle to power a Mars flight carrying a human. Trump has now said he wants a moon priority launch, rather than a Mars priority launch.

The coupe is inside the nose cone of the second stage, not shown in the top photo.

LAUNCH VEHICLE	FALCON HEAVY	SPACE SHUTTLE	PROTON M	DELTA IV HEAVY	TITAN IV-B	ARIANE 5 ES	ATLAS V 551	JAPAN H2B	CHINA LM3B
PAYLOAD TO LOW EARTH ORBIT (LEO)	63,800 kg 140,660 lb	24,000 kg 53,790 lb	23,000 kg 50,710 lb	22,560 kg 49,740 lb	21,680 kg 47,800 lb	20,000 kg 44,090 lb	18,510 kg 40,810 lb	16,500 kg 36,380 lb	11,200 kg 24,690 lb



This page shows (top) the coupe as mounted in the second stage noise cone and (below) the Falcon Heavy on the launch pad in Florida.





Here's a photo of the Feb. 7 launch.



The three launch rockets returned to earth under power from most of their 27 rocket engines. The first two landed tail - down in Florida, and will be reused.

The third rocket had engine ignition problems and missed its floating landing pad.

**It was a very cool week for a Cool Kid in Space.**



## **Outreach and Education:**

### **TAO on February 3**

It was a rainy evening at TAO but quite a few folks showed up anyway. There were only clouds to view, but we had good discussions about astronomy and ORION.



We even had an ORION board meeting, as previously announced at the January ORION meeting.

### **Tellico Village Astronomy Club**

The Tellico Village Astronomy Club met on February 7th, for the first time since October. We took time off for the holidays. Sixteen members were present, including 5 new people. The issue of poor meeting attendance, mailing and event attendance was addressed and better publicity utilizing the Connection newspaper, Next Door, news postings and our own e-mail list will be done

We plan to include TAO as our monthly STAR PARTY and will join KO for some dark sky trips. We are still trying to locate a suitable observing site within Tellico Village

## More About ORION

ORION is an amateur science and astronomy club centered in Oak Ridge, TN that was founded in April 1974 by a group of scientists at the United States Department of Energy facility in Oak Ridge, Tennessee. We serve Oak Ridge, Knoxville, and the counties of Anderson, Knox, and Roane.

ORION's mission is to support science research, teaching, and amateur astronomy in East Tennessee, and therefore we are closely associated with and support TAO by volunteering to host their public events, share our knowledge of the skies with a variety of telescopes, and help provide intellectually stimulating programs at the observatory. ORION works to share the wonders of the cosmos and the culture of science to people from all walks of life.

Members are scientists, engineers, technicians, and others with varied talents and expertise. Over half have telescopes, many are amateur radio operators, and some have a technical interest in astrophotography.

ORION has working relationships with several organizations, including museums and amateur astronomy groups.

Membership is open to individuals who will actively contribute their time and ideas. Our annual membership dues are \$20.00 and student discounts are available.

### Board:

Bob Edwards  
David Fields  
Linda Fippin  
Noah Frere  
Jennifer Hartwig  
Roger Lane  
John Mannone  
Roy Morrow  
Bob Williams

### Officers:

President: David Fields  
Vice President (Program Chair):  
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Secretaries: Linda Fippin, Bob  
Edwards  
Treasurer: Noah Frere  
Editors: Roy Morrow, Linda Fippin,  
Publicist: Jennifer Hartwig  
AV Coordinator: Bob Williams  
Videographers: John Preston and  
Rob Fowler