

August 21, 2017
eclipse special events

- Nashville research team
- Planetarium Eclipse Celebration

A record number of students go for the Physics/Engineering Dual Degree program

New attendance record for the Planetarium

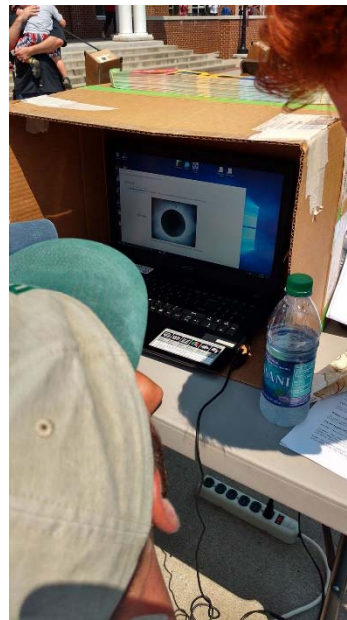
2018 Arctic Geophysics trip update

Solar Physics research team is successful in Nashville

Dr. Michael Freed led a group of 9 current and one former RU student to Nashville, Tennessee to study the August 21, 2017 eclipse in the path of totality. Dr. Freed writes,

“Radford sent a group of Physics students to Nashville, TN to research the eclipse. Nashville experienced the total solar eclipse for approximately 2 minutes, which provided an opportunity for us to take images of the Sun's lower atmosphere (corona). The Moon completely blocks the light coming from the Sun's surface. This, in

turn, provides scientist an opportunity to view the fainter lower atmosphere of the Sun.



We were also able to capture plasma structures found very close to the Sun's surface (photosphere). The most notable one is called a solar prominence, which consist of plasma suspended by magnetic fields above the Sun's surface, much like a hammock. These structures are critical because they hold the potential of becoming unstable and produce coronal mass ejections (CMEs). We were also able to capture polar plumes. The plume

structures were very pronounced because the Sun is presently experiencing a lull in its solar activity.



Physics major Morgyn Church (standing, left, talking with Dr. Freed) was in charge of taking the corona images during the total eclipse. This work was part of a national effort, called Citizen CATE (Continental-America Telescopic Eclipse) experiment, to create images of the corona during totality. The images can be stitched together to create a movie

that will help scientist understand how the Sun's atmosphere evolves over short periods of time.

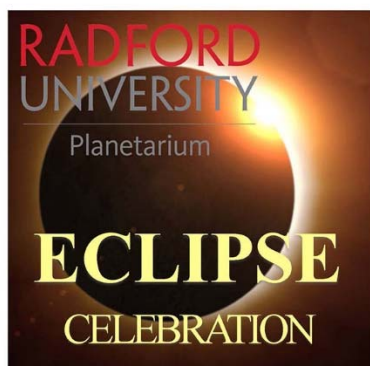
One of the primary goals of the CATE project was to use the observations of the corona to determine the accuracy of the models we use to predict the structure of the Sun's corona. The validity of these models is essential because they are used when making

forecasts of space weather, which can have a significant impact on our daily lives. These solar storms (CMEs) can, and have, knocked out power and disrupt communication. Solar physicist found a remarkable agreement between the predictions made by their models and our observations captured on the eclipse day.” – *Dr. M. Freed*



Radford University Planetarium Eclipse Celebration

The Planetarium coordinated an Eclipse Celebration for everyone in the area, and to connect visitors with our research team in Nashville. This celebration included an eclipse-themed planetarium show called "Eclipse 2017." This show included both live portions and of a number of educational video segments from NASA's Museum Alliance "informal" museum educator group (<https://informal.jpl.nasa.gov/museum/>, the planetarium is a long-time group member).



RADFORD UNIVERSITY

Department of Physics

**ALL AGES EVENT!
FREE ACTIVITIES!**

Free eclipse glasses provided by NISEnet.org*

Look for sunspots & solar flares through a telescope

Live stream chat with solar researchers

Watch eclipse themed planetarium shows running throughout the day

Check out the Museum of Earth Sciences in the same building

Paint a space-themed picture with artists and take your canvas home*

WHERE

RU Center for the Sciences – Planetarium
801 East Main Street
Parking in Lot E across University Drive Bridge

WHEN

August 21, 2017
10:00am-5:00pm
Eclipse 1:00pm-4:00pm

WWW.RADFORD.EDU/PLANETARIUM



Enjoy hands-on fun activities courtesy of the Children's Museum of Blacksburg, the Radford City Public Library, and the RU Physics Department



Be part of a nation-wide eclipse tracking program!



*while supplies last

We had a number of partners in this effort providing hands on activities and educational displays. These partners included the adjacent Museum of the Earth Sciences (run by our Geology Department), eclipse-themed painting workshops from Christiansburg Wine & Design, numerous children's activities courtesy of the NISE Network (<http://www.nisenet.org/>), "solar cookie" making, space-themed activities courtesy of the Blacksburg Childrens' Museum (<http://www.blacksburgchildrensmuseum.org/>), a

number of volunteers, and an 8-inch telescope with a solar filter for viewing the sun throughout the day.

We had anticipated up to about 500 people showing up throughout the day. However, we were totally amazed, excited, and a bit overwhelmed when approx. 1,500 people showed up! It was amazing.



We had nine "Eclipse 2017" shows throughout the day. Between these shows we were videoconferencing with our team in Nashville. Pictured below is Nashville star, video host, and RU alumnae Jennifer Maguire.



It was a day-long party, there was clear weather, we invited everyone, and apparently they all showed up!



Record number of Physics/Engineering Dual Degree students

Our Physics/Engineering Dual Degree program with Virginia Tech continues to grow. We had 5 acceptances to Tech this spring/summer and they started this fall (2017).

New record numbers for the Planetarium

In calendar year 2017 the RU Planetarium saw 7,320 visitors in 286 individual shows. Within this total are 1,334 "Science Day" visitors, those large K-12 school groups coming for a full day event including the Planetarium, a physics show, our Museum of the Earth Sciences, a chemistry show, a biology event (involving live animals and/or plants), and a forensic science presentation.

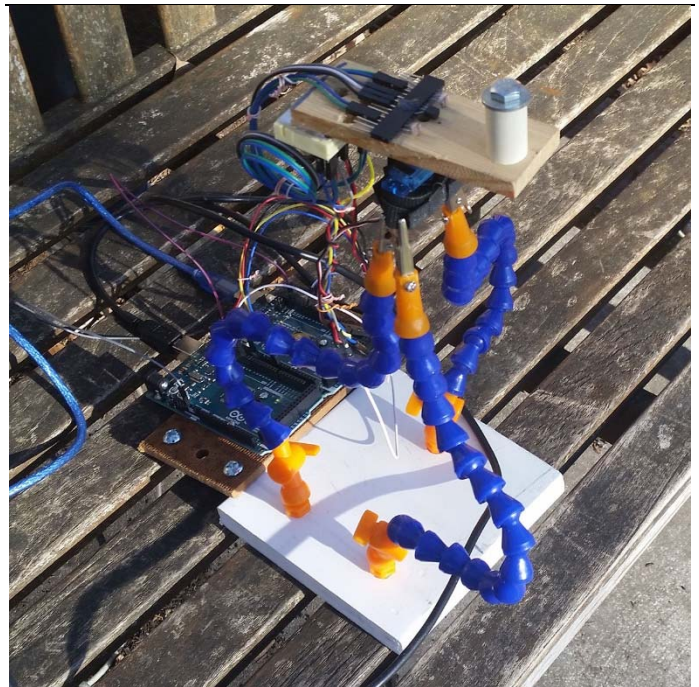
A number of you worked in the planetarium as workstudys. We have three again this year who are doing a great job. One, in fact, "Captain Melly" Lucas, even ran 9 separate shows for the August 21 Eclipse Celebration!

2018 Arctic Geophysics class/trip update

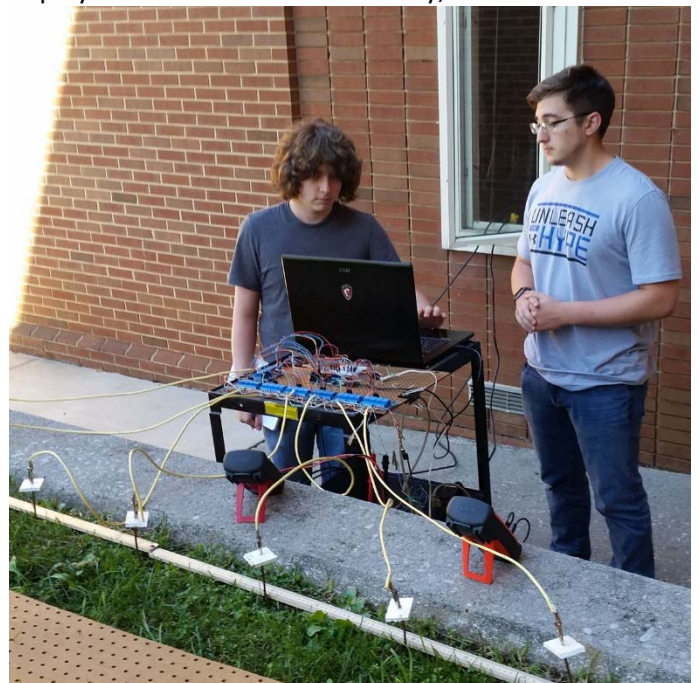
The 2018 PHYS 325 – Arctic Geophysics class is preparing in much greater detail than in any past year. This trip is the result of so many in the past, and we are finally pulling together all of the past information to drive the work on this trip. Two physics majors have been working hard on Independent Study projects involving custom-made equipment for this class.

Ryan Fry has constructed a successful prototype for an "active sun shield" (photo at top of next column) for the temperature sensors that will be vertically arrayed above the ice. As many of you know and experienced, in 2016 we used field hockey practice cones to try to recreate the pagoda-like passive sun shields. This Arduino-based original design uses photoresistors to keep the air temperature sensors in the shade zone of a small vertical post.

Michael Hess (left) and Ryan Fry successfully test the Arduino-based micro resistivity array on campus next to the research lab in Preston Annex.



Michael Hess and Ryan have been working on an automated dipole-dipole "micro resistivity array." This array is designed to get around the problems we have had in the past with the OhmMapper resistivity array being designed to see subsurface features at depths greater than 1.0 meter. We have tested the "pre-pre-prototype" on campus, and found that it works as we had hoped. They are working on the final version to be deployed on the ice in late February, 2018.



We now have a set of well-defined science goals for the upcoming trip, with each of these goals the result of so much work that has been done on previous trips. Those goals include a custom-made micro resistivity array, vertical temperature sensors w/ active sun shields, the OhmMapper “expanding dipole-dipole array” (yes, we have figured out and **fixed** the cause of the data failures in the past!), an IR sensor for the ice surface temperature, and an ice vibration monitor (3-axis custom-built accelerometer, milli-g resolution).

Thanks to all of you who participated in past trips and whose findings will make this one successful!

One last chance for alumni \$upport

As you know these trips to Alaska are extraordinary experiences but also great financial burdens. Each student will be buying their own plane tickets and will be paying \$1,300 for their week in Barrow/Utqiagvik. If you would like to make a contribution to offset some of these costs, details for making a contribution are below. Any help is appreciated, from a single \$25 donation for one evening meal in the Iisagvik College cafeteria (all things are very expensive up there), to a \$160 land-use permit (required to be on the “corporation” (i.e. “tribal”) lands, to the \$300 for various logistics costs, to the \$770 per student per week cost of lodging. All support is greatly appreciated.

Contact Us

Let us know how you're doing, what you're doing, and where you're doing it!

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We have moved! ... temporarily...

Reed and Curie Halls are closed until the fall of 2019 for major renovations. This \$34million project will completely remodel and update the interior of both buildings. In the meantime our offices are in McConnell (2nd floor, along with the Geology Department's offices), our teaching labs are in Walker (where the ginormous computer lab used to be), and some research labs are in the Preston Annex (along with some Chemistry research labs). We cleared out of Reed-Curie in July/August with a projected date of August, 2019 for being back in the buildings. Some preliminary work was accomplished this fall. The construction fence shown below appeared on Friday, December 22, showing that it's time for the real work!



<http://www.radford.edu/physics>

<https://www.facebook.com/Radford-University-Physics-252289272464/>

To donate **directly** to the Physics Department, or one of the funds within the department click the following link:

<https://connect.radford.edu/give>

After filling in your donation amount, go to the pull-down list and select “Other (please specify).” Then type any of the following into the box:

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