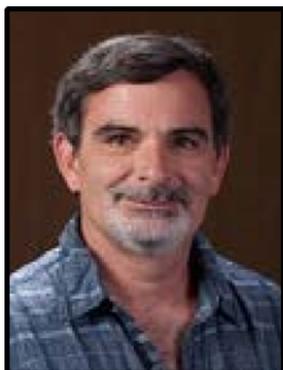


# Physics on the Hill

Spring 2017, Volume 13, Issue 1

Welcome from Dr. Michael Carini,  
Department Chair



It is spring on the Hill. We have had another fantastic year here in the Department of Physics and Astronomy and the pages that follow do our best to highlight that year.

Our students presented their research results at local, regional, and national conferences and earned awards for their presentations. Our faculty continue to receive external grants and publish

research papers. One of the most exciting pieces of news is that Andrew Davis, a double major in physics and mathematics, was awarded a Goldwater Scholarship, one of only two awarded in Kentucky.

Change is inevitable, and we have seen some changes in the department. Doug Jenkins, alumnus, friend, and most recently part time instructor at Glasgow, is leaving for full retirement. We will miss Doug greatly. Dr. Ed Kintzel, an associate professor and faculty member for the past nine years has decided to leave to explore opportunities in the private sector. Dr. Kintzel, who brought us the LC-SEM and created the NOVA Center, will be missed by his colleagues and students. I am honored to announce that in January, I was selected as Department Chair. In the fall, we will be welcoming a new permanent instructor, Dr. Jason Boyles, and two new temporary instructors.

Ogden Hall is nearly complete, and next year we will be able to give you a sense of the wonderful new facilities available to our students and faculty. We look forward to better serving our students in the coming year!

## Contents

- Department Spotlights.....2
- Student Accomplishments...3
- Eclipse Preview.....4
- Community Outreach.....5,6
- Featured Alumna.....7
- API .....8
- Donate.....9



# Department Spotlights

## Faculty Spotlight: Steven Gibson

---

Dr. Steven Gibson grew up in a small town in Michigan. He obtained his Bachelor of Science at Alma College, where his father was a physics professor. After graduating, Dr. Gibson attended University of Wisconsin, where he continued his studies in both astronomy and physics. Dr. Gibson's research is focused on using radio telescopes to study the galaxy, specifically interstellar gas clouds and dust clouds. Dr. Gibson was drawn to astronomy because he liked "studying our place in the grand scheme of things." He is fascinated by using the tools of science to study objects that are millions of miles away. Although Dr. Gibson has been at WKU since 2008, his favorite class is still "whatever one I'm teaching right now." Dr. Gibson will be spending the 2017-2018 academic year on sabbatical at the Academia Sinca Institute of Astronomy and Astrophysics in Taipei, Taiwan. He will be working with world renown experts expanding his knowledge in the role dust has on the physics of the clouds that collapse to form stars and solar systems.



◀ Faculty Spotlight:  
Steven Gibson



▶ Senior Spotlight:  
Andrew McGuffey

## Senior Spotlight: Andrew McGuffey

---

Andrew McGuffey, a physics major from Scottsville, Kentucky, will be graduating this May. During his time at Western Kentucky University, Andrew has worked as an intern at the Bowling Green Medical Center where he helped streamline treatment plans for cancer patients. Andrew has also worked as a teaching assistant in the Biophysics Laboratory and as a physics tutor. In the summer of 2016, he received funding from the American Association of Physicists in Medicine to study at the John Hopkins University School of Medicine. At John Hopkins, he studied microscale internal dosimetry using the Geant 4 Monte Carlo code. Andrew was awarded (along with Stefan Stryker) the 2017 Dr. George V. and Sadie Skiles Page Award for Excellence in Scholarship. He plans to attend Louisiana State University in the fall where he will continue his studies in medical physics.

# Student Accomplishments

## Stefan Stryker

---

Stefan Stryker, a senior with a physics major and mathematics minor, received the Dr. George V. and Sadie Skiles Page Award for Excellence in Scholarship (along with Andrew McGuffey) based on his outstanding academic record as a WKU student. Stefan has worked as an intern at the Bowling Green Medical Center's Cancer Treatment Center and at University of Kentucky's Health and Science Research Lab and Department of Radiation Medicine. He has also worked as a tutor in the department Help Center and as a teaching assistant in the Biophysics Laboratory.

In summer 2016, Stefan received a fellowship from the American Association of Physicists in Medicine, which provided support for study at the Yale School of Medicine. Stefan will continue his studies next fall at Duke University, pursuing a graduate degree in medical physics.

## Seth Harper

---

Seth Harper, a senior with majors in physics and mathematics, received the Dr. Randall Harper Award for Outstanding Research in Physics and Astronomy for his work on detecting hydrogen sulfide in natural gas, which is important to the area of clean energy provided by fuel cells. He also worked to develop a safe chamber to mix known concentrations of hydrogen sulfide and developed a method for calibrating this system.

Seth currently works with Dr. Vladimir Dobrokhotov as an undergraduate research assistant at the WKU Applied Physics Institute. Seth plans to continue work at the Applied Physics Institute and to pursue a graduate degree in aerospace engineering.



## Trason Carter

---

Trason Carter, a senior with majors in physics and mechanical engineering, received the Doug Humphrey Award for Outstanding Service for his good citizenship and long-standing support of a range of faculty and student activities in the department.

These activities include his service as president of the WKU chapter of the Society of Physics Students, where he works to build membership, comradery, and community. Trason is also a regular volunteer at outreach events such as the Physics Olympics and the Science Olympiad.

Trason is presently using the skills he has acquired as a double major in Physics and Mechanical Engineering to assist his fellow students under the direction of Dr. Steven Gibson with a project to build a radio telescope using a large satellite dish donated to the department by alumna Stacy Hicks.

# Total Solar Eclipse

August 21, 2017

For the first time in 38 years, a total solar eclipse will be visible from the continental United States, passing right over the hill!

## WHAT IS A TOTAL SOLAR ECLIPSE?

The moon and the sun are nearly the same size in the sky as seen from Earth. When the Earth, moon and sun are aligned, the moon passes directly in front of the sun as seen from Earth, resulting in a total solar eclipse. On August 21, totality will occur at exactly 1:27:23 p.m. and last one minute and 16 seconds here on the hill.

## WHAT HAPPENS DURING A SOLAR ECLIPSE?

The sun will be obscured from view by the moon, and the sky will darken as if in deep twilight. There will even be a noticeable temperature drop.

## ABOUT ECLIPSE DAY!

Wherever you plan to view the eclipse, prepare for large crowds, a hot sun, and lots of waiting!

Arrive early and anticipate traffic and crowds. Bring sunscreen, hats, drinks, snacks, and a chair or blanket.



NASA recommends the use of a special protective filter to protect your eyes from the sun while viewing the eclipse. Get your own Bowling Green Eclipse Viewing Card and other Eclipse memorabilia from the Hardin Planetarium Gift Store:  
(<https://www.wku.edu/hardinplanetarium/store.php>)

# Q&A with Richard Gelderman

## D

### What is your favorite part about working planetarium events?

Working in the planetarium involves a number of fantastically wonderful aspects. First, the building's exterior is such a campus icon. Second, the people who arrive at the planetarium tend to come there voluntarily. Third, the topics for astronomy are deeply interesting and loved by a huge fraction of people. The Q&A times in the planetarium are something I always look forward to.



### How do you choose which topics to present at the planetarium?

The planetarium's presentations and exhibits are selected when they are simultaneously timely, interesting, comprehensible, and able to be shared with interactive activities to fully engage the audience.

### What eclipse-related planetarium activity are you most excited for?

The planetarium is deeply involved in planning for the events related to the upcoming total solar eclipse. Our emphasis is firstly to make sure people know that the eclipse is happening and how to safely enjoy this natural spectacle.

### How are students involved in the planetarium shows?

The planetarium relies on volunteers and part-time student workers. The dedicated effort of students is the only way we can have enough personnel to keep up a reasonable level of staffing expected for our outreach activities.

## 2017 SCHEDULE

### "Starry Tales for a Winter Night"

Jan. 3 – Feb. 14

### "Curiosity and a Habitable Mars"

Feb. 16 – Feb. 28

### "Phantom of the Universe: The Hunt for Dark Matter"

Mar. 1 – Apr. 30

### "Into the Shadow of the Disappearing Sun"

May 1 – Aug 20



# Community Events

## Southern Kentucky Science Fest

Since its creation in 2015, the Southern Kentucky Science Festival has been a place for curious minds to gather and discover more about science. This year's Expo Day will take place August 20<sup>th</sup> in Circus Square Park in downtown Bowling Green. It will feature stage performances, booths, and vendors from organizations across the region.



## Physics Olympics

Saturday, February 25, the Physics and Astronomy Department invited high schools to send teams of four to compete in the Physics Olympics. This year, the theme was "Physics of Shadows." The students competed for a \$600 scholarship by manipulating the shadows and light during three main events.



## Science Cafe

On the last Monday of every month, SKy Science Festival and 6-4-3 Sports Bar collaboratively bring science enthusiasts together to discuss topics in a wide of variety of fields. Meetings over the past year have included topics as diverse as solar energy, viruses, and gender identity. The event is open to all community members.



# Alumna Spotlight

Naomi McAfee: The first woman to graduate from WKU with a physics degree!



Naomi McAfee has made a career out of paving the way for future generations of women engineers. She graduated from Western Kentucky University (then known as Western Kentucky State College) in 1956 as the first woman to earn a physics degree from the department. After graduation, she went on to work as a mathematician at Westinghouse Electric, which at the time was an all-male engineering establishment. She was the first woman to hold a supervisory engineering position at the company.

Throughout her career, Naomi McAfee has also worked with the Department of Defense, the Army Science Board, and both the Department of the Army and Air Force. She worked on projects that helped develop the Apollo lunar camera and an airborne radar system. As member of the Society of Women Engineers (SWE), she is recognized as a pioneer for her many accomplishments, including serving as the National President for the SWE from 1972-1974. McAfee retired from Westinghouse in 1994 after working there for 38 years. After working for almost 10 more years at an engineering consulting firm, she retired fully in 2003.

At WKU, Naomi McAfee has had a lasting impact. The Naomi Jones McAfee SKyTeach Scholarship Fund provides scholarships to female participants in the SKyTeach program to help further their education. McAfee was also inducted into the WKU Hall of Distinguished Alumni in 2015.

# Applied Physics Institute

The Applied Physics Institute(API) continues to evolve as the needs of the region and the nation for unique applications of Physics to real world problems changes. The API has shifted its research emphasis from using high energy particles to detect the sulfur content in coal, the quality of concrete and explosives in cargo containers, to more sophisticated methods drawn from condensed matter and solid state physics to detect a wide variety of hazardous materials in places where they pose a threat to health and safety. The API is now leading efforts at developing devices that can sense hazardous compounds in food, the air, water and even on your breath.

An example of the exciting work ongoing at the API is a project (funded by the Kentucky Commercialization Fund) to design a wearable monitor for first responders. This monitor would detect and alert first responders to the presence of hazardous materials in the area, and help pinpoint the exact location (via built in GPS capabilities) of the hazard.

Despite the change in research focus, hands on research experiences for undergraduate Physics majors and graduate students in the Homeland Security Sciences MS program remains a top priority. Undergraduate students from the Physics department as well as the Engineering department are active participants in the ongoing research efforts at the API.

The API is currently led by our newly promoted Professor, Dr. Vladimir Dobrokhotov. Its accomplishments have been highlighted in a recent posting from the WKU Research Foundation (<https://wkurf.org/applied-physics-institutes-solid-state-physics-research-spans-industries-defense-food/>)





# Donate

## Scholarship Fund Donations

Contributions to the Department of Physics and Astronomy go a long way to ensuring that we have sufficient laboratory equipment and scholarship support for our students. Your help is needed more than ever as budgets remain extremely limited. Please consider contributing to the department and to the university. Be sure to specify that the money be designated for use by the Department of Physics and Astronomy. Donations can be made to our general development fund or to any of our departmental scholarship funds listed below. Details on how to make gift can be found at <http://www.wku.edu/dar/>.

- Paul B Campbell Scholarship Fund
- George C. Moore Physics Scholarship Fund
- George V. and Sadie Skiles Page Scholarship Fund
- Marvin W Russell and Robert S. Hall Scholarship Fund
- Madole Family Scholarship Fund
- Randall Harper Memorial Scholarship Fund
- Doug Humphrey Award for Outstanding Service in Physics and Astronomy

### **Our profound thanks to our contributing alumni!**

For information concerning contributions to specific labs or other initiatives or about specific departmental needs, please contact:

Dr. Michael Carini, Department Chair  
Department of Physics and Astronomy  
Western Kentucky University  
1906 College Heights Blvd.  
Bowling Green, KY 42101-1077  
(270) 745-4357/mike.carini@wku.edu

Facebook:  
WKU Physics and Astronomy

Twitter:  
@wkuphysastro

Thanks to the students from Professor Angela Jones ENG 402 class (Lydia Anvar, Hannah Good, Sarah Redding and Alex Sandefur) for their assistance in creating this newsletter.