

FROM THE DEAN'S DESK – September 19, 2016

THE RADFORD UNIVERSITY COLLEGE OF SCIENCE AND TECHNOLOGY NEWSLETTER



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DEPARTMENT OF INFORMATION TECHNOLOGY RECEIVES STELLAR REACCREDITATION

Radford University's Computer Science, Information Systems and Web Development concentrations in the Computer Science and Technology and Information Science and Systems degree programs have received reaccreditation by the Computing Accreditation Commission of ABET, the global accreditor of college and university programs in applied science, computing, engineering, and engineering technology.

The Department of Information Technology at Radford University regularly reviews practices and procedures in relation to student competency and learning outcomes to self-assess the quality of the programs offered. In addition to this internal process, the department also participated in a 15 month process to receive reaccreditation from ABET, an external source.



ABET accreditation assures that programs meet standards to produce graduates ready to enter critical technical fields that are leading the way in innovation and emerging technologies, and anticipating the welfare and safety needs of the public.

“Reaccreditation by ABET until September 30, 2022 is external validation of the superior quality of the Computer Science concentration and the Information Science and Systems degree here at Radford University” said Dean of the College of Science and Technology, Dr. Orion Rogers. “This impressive achievement was earned through the faculty members’ commitment to excellence in teaching, scholarship and service and to the extraordinary leadership of the department chair Dr. Jeff Pittges and the coordinators of the Computer Science and Information Science programs.”

The Radford University Computer Science program began in 1983 and first received ABET accreditation in 1992. The most recent general review was in 2010. The Information Systems and Web Development programs were established in 2001 and first received ABET accreditation in 2010.

Unique for the 2016 reaffirmation of accreditation was that both Radford University programs were accepted without need of any adjustment or modification following the final assessment by ABET.

“Achieving ABET reaccreditation is a significant accomplishment in itself, but to earn reaccreditation with no deficiencies, weaknesses or concerns is a remarkable distinction for Radford University” stated Dr. Rogers.

Dr. Art Carter, Associate Dean of the College and Professor in the Department of I.T., served as the Chair for the reaccreditation committee and stated “This has been an important year for the Department of Information Technology: First the National Security Agency recognized Radford University as a Center of

Academic Excellence and second the reaccreditation of our ABET accredited programs.” He added “These major events provide external validation of the quality of our Information Systems, Computer Science and Cyber Security programs.”

Sought worldwide, ABET’s voluntary peer-review process is highly respected because it adds critical value to academic programs in the technical disciplines, where quality, precision, and safety are of the utmost importance. Developed by technical professionals from ABET’s member societies, ABET criteria focus on what students experience and learn. ABET accreditation reviews look at program curricula, faculty, facilities, and institutional support and are conducted by teams of highly skilled professionals from industry, academia, and government, with expertise in the ABET disciplines.

More than 400 students are currently enrolled in two degree programs containing six total concentrations within the Department of Information Technology at Radford University. To learn more about these programs please visit <http://www.radford.edu/content/csat/home/itec.html>

NEW RADFORD UNIVERSITY PLANETARIUM TO TAKE VISITORS ON TOUR OF THE COSMOS



Radford University Planetarium

This fall, spectacular shows will take people on tours of the night sky, the solar system and the broader universe on a greater scale than ever before in Radford University's new state-of-the-art planetarium.

Shows will begin in the facility on Tuesday, Sept. 20 with "SEPTEMBER SKIES" at 7pm. Visitors will have the opportunity to see the stars and constellations that are visible this month with the new state-of-the-art digital projection system.

Participants will learn why the constellations were named in the first place and take a tour of the solar system and beyond. Additional shows will take place on Thursday at 7pm and Saturday at 10:30am. The fully-digital planetarium features 55 theatre-style seats, an enhanced projector system and a new dome. It is located in the Center for the Sciences building, which opened in fall 2015. In addition to the planetarium, the \$49 million, 114,000square-foot facility features the Museum of the Earth Sciences, high-tech classrooms and laboratories, teaching and learning spaces and updated furnishings and equipment.

The planetarium is located on the first level of the Center for the Sciences building, room M75. Visitors should enter the center from Main Street, through the doors next to the planetarium sphere. Seating is limited to 55 people, and no food or drinks are allowed.

Upcoming screenings include the "Seven Wonders" and "Dinosaur Prophecy." For a full schedule and description of the shows, visit the [Radford University Planetarium website](#). All shows are free and open to the public.

CENTER FOR THE SCIENCES TO BE DEDICATED DURING HOMECOMING AND FAMILY WEEKEND



President Brian O. Hemphill, Ph.D.
invites you to
the dedication and ribbon cutting for the
Center for the Sciences
Friday, October 14, 2016
3 p.m.

Main Street Entrance of the Center for the Sciences

Reception and tours will follow the program

The Center for the Sciences is a new 114,000 square foot facility for the College of Science and Technology. By enhancing CSAT's mission of teaching, research, outreach and service, the building immerses Radford University students in the "laboratory culture of inquiry."

An exciting platform for scientific discovery and home to teaching spaces, laboratory spaces, offices and outreach facilities, the Center for the Sciences houses the departments of biology, chemistry, anthropological sciences, the Radford University Forensic Science Institute, RU Planetarium and Museum of the Earth Sciences.

Other distinctive features include:

- The Novozymes Biology Lab
- The Artis Computing Laboratory for Biological Sciences
- Anthropological Sciences teaching lab with an Anatomage table, a virtual cadaver facilitating anatomical and anthropological discovery
- Student research and collaborative learning spaces
- Instructional labs for courses such as chemistry, microbiology, genetics, molecular biology, with teaching and learning modalities, including an insectarium, a BSL-2 facility and a 400 MHz nuclear magnetic resonance spectrometer

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MUSEUM OF THE EARTH SCIENCES TO DEBUT ON OCTOBER 15

After years of planning and many months of hard work constructing displays, the new Museum of the Earth Sciences will make a formal debut on Saturday, October 15 with a ribbon cutting, guest speakers, a tour, and more. The Museum of the Earth Sciences is a project of the Department of Geology and is directed by Dr. Steve Lenhart.

A staple of College of Science and Technology outreach for the past decade, the Museum in its original location enthralled more than 20,000 visitors with exhibits featuring dinosaurs, gems, minerals, and the wonders of the earth. In the new location, visitors will have new and enhanced displays in a space more than three times larger than the previous site. In a premier location on the Main Street level of the Center for the Sciences, the Museum of the Earth Sciences serves as a hub for geologic exploration in Southwest Virginia.

For details, please visit the Museum of the Earth Sciences website at www.radford.edu/mes



Former Virginia Secretary of Education, Ms. Anne Holton viewing the model quarry in the Museum of the Earth Sciences during her visit to campus in April while the space was still in construction mode. This exhibit, once on display in the Smithsonian Institution will feature narration from Roanoke's long time weather anchor, Robin Reed.

CAREER PREP CONFERENCE TO FEATURE THREE CSAT RELATED PANELS

The Radford University Career PREP Conference, scheduled for Saturday, September 24th from 12:00 p.m. to 4:00 p.m., is a half-day experience that will help students get ready to enter professional life. With guest speakers, career-related workshops and alumni networking opportunities, the conference is step one on the journey to the career of a lifetime for Radford students.

Departments within the College of Science and Technology are sponsoring three panels related to careers in STEM:

Environment and Geosciences with panelists Daniel Hansen, Associate, Balzer and Associates, Inc. and Laken Cooper, Adjunct Faculty, Radford University;

Forensic and Laboratory Science with panelists Lucy Ann Hochstein, Forensic Autopsy Technician, VA Office of the Chief Medical Examiner; Dr. Maher "Max" Nouredine, President, ForensiGen; and Steven Harvey, VP of Manufacturing and Radford Operations, Tech Lab

Information Technology and Cyber Security with panelists David Bradshaw, Chief Executive Officer, InteractiveGIS; Gina Gallagher, President, AOC Key Solutions, Inc.; Keith McCammon, Co-Founder, Red Canary, Kyrus Technology; and Jess Astacio, System Analyst, Eastman Chemical.

CSAT FACULTY FEATURED ON REGIONAL NPR PROGRAM

Over the summer, Radford University faculty Sara O'Brien and Stockton Maxwell were featured in two unique radio broadcasts of "With Good Reason."

with
good
reason



Synthetic hormones flood the waterways, and Radford University Biology Associate Professor Sara O'Brien is conducting experiments to pinpoint the source of human-made hormones and the consequences of exposure to them.

The canary-in-the-coal-mine for Dr. O'Brien's research, she says, is the ubiquitous "mosquito fish."

Dr. O'Brien spoke about her research on the With Good Reason radio program and the interview aired Aug. 13-19 on more than 60 With Good Reason stations across the United States.

Dr. Stockton Maxwell, assistant professor of Geospatial Science, joined with other experts to discuss global climate change in the show, titled "The Music of the Glaciers."

During Dr. Maxwell's segment of the program, he spoke about the effectiveness of studying tree rings to help solve climate change.

"I use the annual growth of trees and the carbon content within those rings to help decipher what the climate and environment was like prior to human observations and instrumental records," Dr. Maxwell explained. "For example, some of my current work is focused on understanding how much carbon forest have stored over the past centuries in New England. If we have a better idea of how forests have grown and stored carbon, we can then assess the impacts of a changing climate of our forests."

Dr. Maxwell's interview aired on stations carrying the "With Good Reason" radio program July 30-Aug. 5. Both episodes featuring Dr. O'Brien and Dr. Maxwell also are available through podcasts at www.withgoodreasonradio.org.

Listeners in the New River Valley can hear the program at 6 p.m. every Tuesday, on Public Radio WVRU 89.9.

With Good Reason is produced by the Virginia Foundation for the Humanities for the Virginia Higher Education Broadcasting Consortium and is broadcast on public radio stations in Alaska, Colorado, Florida, Georgia, Hawaii, Indiana, Massachusetts, Michigan, New Mexico, New York, Ohio, Tennessee, Texas, Virginia and Washington, D.C.

With Good Reason has won five Gabriel Awards for Best Documentary or Public Affairs Programs, and is the recipient of top honors from the Public Radio News Directors, Radio and Television Digital News Association and the Virginia Association of Broadcasters.

SUMMER BRIDGE PROVIDES RICH AND INSPIRING EXPERIENCE FOR ASPIRING WOMEN SCIENTISTS



BAE Systems' Nancy Winslow introduces Summer Bridge students to the quality control laboratory facilities at the Radford Army Arsenal.

There was no fishing from the Summer Bridge or dangling one's feet into the drifting current on a warm sunny day.

Summer Bridge 2016 did, however, provide challenging and enlightening field experiences, lab experiments and professional encounters for almost 70 high school-aged women from across Virginia and the Mid-Atlantic region.

From July 10-15, the Summer Bridge Program, hosted by Radford University's College of Science and Technology, held its 11th session to explore science and technology and was the

first to use facilities in the new Center for the Sciences.

For example, students in the Genes, Molecules and Medicine track took to the field for a behind-the-scenes look at the sprawling Radford Army Ammunition plant, courtesy of plant contractor BAE Systems. On the same day, they toured the lab and production facilities at Salem's Novozymes Biologicals. The field trips complemented the team's week-long introduction to the contemporary applications of biology and chemistry.

In addition to learning and working with Radford faculty and students, the Summer Bridge students networked with women in the science and technology fields.

Kim Meuer, a BAE Systems' nitroglycerine production manager, was one of many women working in science and technology fields who emphasized the value of a STEM-H (Science, Technology, Engineering, Mathematics-Health) education.

"Both my parents were engineers, so I grew up surrounded by science," Ms. Meuer said. "I enjoyed the opportunity to discuss the opportunities with these young women today and give them all a chance to see what's possible. Because you never know where your career can take you."

Representatives of Kollmorgen, Tork Robotics and the FBI also briefed the students about the potentials and the paths open to them with strong STEM-H backgrounds.

Dr. Brenda May, a minimally invasive robot gynecology cancer surgeon at LewisGale Medical Center, recounted her challenging, non-traditional path toward a medical career on the cutting edge. She told of

accompanying her brother on an emergency room visit that pointed the way to her current career using robotic surgery to perform cancer surgeries.

“I got to look through a window into the human body,” she said. “I have never gotten over that curiosity. I was really determined.”

Dr. May was accompanied on her visit to Summer Bridge by a da Vinci XI Surgical System that enables surgeons to operate through small incisions with a magnified 3D high-definition vision system and tiny, flexible wristed instruments. Many of the Summer Bridge students hope to go into medicine, so they tried the system that LewisGale uses for a variety of surgeries. They also inundated Dr. May with questions about her field, preparation for medical school and work-life balance.

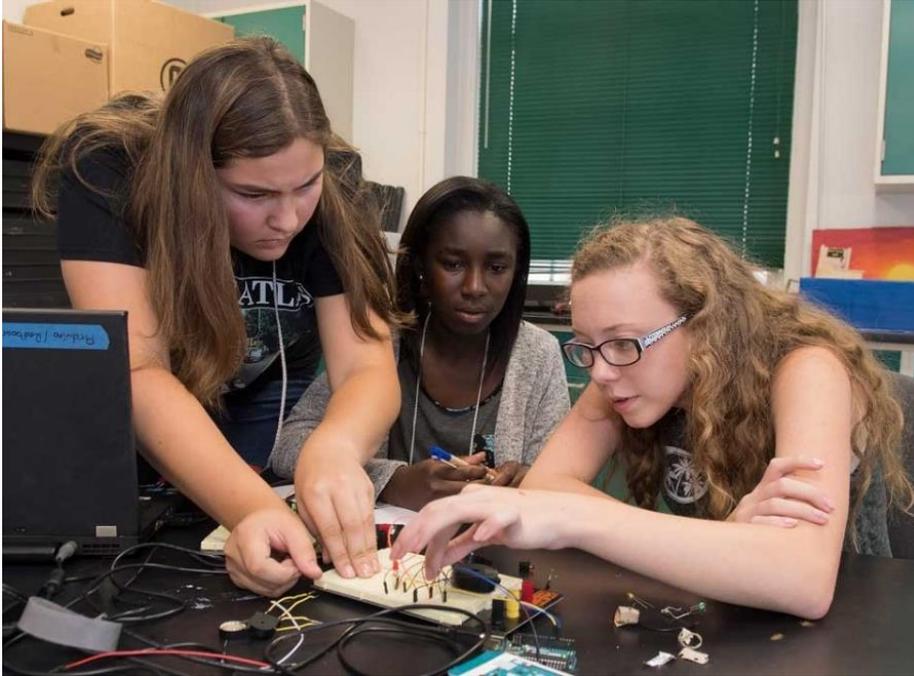
“Your adversities,” Dr. May said as she talked of her career path and her work, “they are the things that will define you.”

A forensic sciences and cyberdefense exercise combining cyber criminals, emergency management and crime scene protocols at the city of Radford Public Safety building took some students into the field as did a trip to Mountain Lake where others sampled the work that goes on in earth sciences and geo-engineering.

Students in the Bots and Bits track explored electronics, robotics, mathematics and physics. In the process, they prototyped a suit for the latest movie super heroine, the Iron Maiden. Mathematics and Statistics Instructor Brenda Hastings, now in her fifth year as Summer Bridge faculty with Professor of Physics Rhett Herman, marveled at the students’ commitment to their projects, saying:



Dr. Brenda May, a minimally invasive robot gynecology cancer surgeon at LewisGale Medical Center, recounted her challenging, non-traditional path toward a medical career and introduced the daVinci XI surgery technology with which she works.



“ We had to force them to leave the lab and go to dinner. They were determined to get it working and solve the problems that were slowing them down.”

Students in the Bots and Bits track get some hands-on experience working with electronics, robotics, mathematics and physics.

Faith Nicholson joined daughter Samantha, a sophomore from Chincoteague High School, for the Summer Bridge’s final day. Faith reflected on her daughter’s experience.

“She has learned so much and wants more knowledge now in a field that I don’t think she knew much about,” she said. “I think my shopping for Christmas and birthday presents will be different now as she has asked for the kind of equipment that she has been working with this week.” Joseph Antolin helped facilitate the Summer Bridge camp experience for five Tidewater-area high school students, including his niece.

“There is quite an opportunity for young people today in the hard sciences,” said the father of two daughters who are working now in the engineering fields. “From top to bottom, the Summer Bridge has been excellent.”



In the Forensic Anthropology lab, Summer Bridge students explored osteology and anatomy with a 3D virtual skeleton on the Anatomage table.

NSA/DHS CERTIFICATION PUTS RADFORD AMONG CYBER SECURITY ELITE

At the National Cyber Security Summit in Huntsville, Alabama, on June 8, Radford University was designated a National Center of Academic Excellence in Cyber Defense Education (CAE-CDE) by the National Security Agency (NSA) and the U.S. Department of Homeland Security (DHS).

Through 2021, Radford will be at the forefront of preparing graduates in cyber security and meeting the evolving demands of cyber security education. Radford is one of only six four-year institutions in Virginia designated as a CAE-CDE institution. Radford is one of only 127 four-year institutions in the country to earn the prestigious national designation.



At the National Cyber Security Summit in Huntsville, Alabama, on June 8, Radford University was designated a National Center of Academic Excellence in Cyber Defense Education (CAE-CDE) by the National Security Agency (NSA) and the U.S. Department of Homeland Security (DHS). From left: Suzanne E. Spaulding, DHS Under Secretary for the National Protection and Programs Directorate; Associate Professor of Information Technology Prem Uppuluri; Danny Kemp, Radford's Vice President for Information Technology and CIO; Jeff Pittges, Department of Information Technology Chair and Dr. Leonard T. Reinsfelder, Commandant of the NSA National Cryptologic School.

"The certification distinguishes Radford as a leader in a field that is critical to protecting our national digital infrastructure," said College of Science and Technology Dean Orion Rogers.

"We are honored to receive this distinction from the nation's foremost experts," said Chairman of the [Department of Information Technology](#) Jeff Pittges. "There are very real advantages attached to this designation for our students and faculty that will support Radford's efforts to continue its contributions toward making our nation, and the world, a safer place."

DHS and NSA jointly sponsor the National Centers of Academic Excellence (CAE) program. Schools are designated based on

their robust degree programs and their alignment to specific cyber security-related knowledge units. CAE CDE-program graduates help protect national security information systems, commercial networks and critical information infrastructure in the private and public sectors. Led by Associate Professor of Information Technology Prem Uppuluri, Radford achieved the designation by meeting the program's rigorous standards.

"The NSA and DHS have decided these are areas of competence that cyber security professionals must have and Radford University received one of the highest scores in the country at developing these competencies in our graduates," Pittges said. "You need a complete and comprehensive approach to security and that is what Radford provides."

According to Pittges, the CAE-CDE designation will give Radford additional access to scholarships, research and recruiting opportunities. He pointed out that the designation covers the university as a whole and that it reflects the campus wide commitment to cyber security.

"This is a comprehensive certification, not one targeted at a single department or program," Pittges said. "Our department works with the other departments to create and develop unique opportunities that prepare Radford graduates for a dynamic field in which there is a strong demand."

Uppuluri worked with faculty from the departments of Criminal Justice, and Mathematics and Statistics, as well as the Radford University [Forensic Science Institute](#) and Academic Computing to reflect the campus' range of courses and opportunities.

"Radford has a rich depth of multidisciplinary cyber education classes and provides our students a wide range of research opportunities and exposure to practical cyber applications," Uppuluri said.

The CAE-CDE's designation further aligns Radford with Gov. Terry McAuliffe's initiative for a "New Economy for Virginia." At the Commonwealth Conference on Cyber and Education at Northern Virginia Community College in December, McAuliffe challenged the technology and education leaders to "turbocharge cyber education" and said the technology and cyber fields are "where the jobs of tomorrow will be."

Overcoming the state's deficit of more than 17,000 cyber or technology professionals was the event's clarion call. The challenges of a cyber world in which almost 50,000 spam and virus attacks annually threaten the state's computer infrastructure set a stark backdrop.

"Cyber security highlights the vast area of topics that make up information technology - networking, operating systems, cryptography, digital forensics, software engineering and the backbone of the Internet, web technology," said Uppuluri, who is also the coordinator of Radford's Center for Information Security (CIS). "Radford is part of the solution and we will continue to contribute to the flow of talent that enhances this critical infrastructure."

The CIS is one example of Radford's cyber security initiatives. Among its programs is one that instructs K-12 students and area teachers in cyber security. In 2015, the Center implemented the program, funded by a National Security Administration (NSA) grant, at the Shenandoah and Southwest Virginia Governor's Schools and recently added a program at Christiansburg High School. The CIS also supplements the department's offerings with a certificate program in information security.

Cyber security is also a key component of the curriculum of Radford's M.S. [Data and Information Management](#) (MS-DAIM) program, the only such program in Virginia and the first STEM-H graduate program offered by the [College of Science and Technology](#). The MS-DAIM degree program produces database engineers and administrators, data architects and information managers who design, develop and manage scalable information infrastructure and systems and processes to acquire, protect and deliver valuable information assets.

DR. JUSTIN ANDERSON FEATURED IN CONTAGIONLIVE VIDEO

On September 8, 2016, Dr. Justin R. Anderson, associate professor and chair of biology at Radford University, discussed what factors will aid mosquito control specialists in eradicating vector populations.

“We have an increase in virus replication, changes to the mosquitoes, whether it’s laying more eggs, whether it’s changes in body size, basically all of these will come together to affect the likelihood of virus transmission, basically the epidemiology of these mosquito-borne viruses. This will help us to design or enhance mosquito control aspects. If we know that mosquitoes replicate in, or breed in, plastic containers, [which will] increase the likelihood of transmission, we can go out and reduce those breeding sources, which is a longstanding mechanism for controlling mosquito populations. [If] you get rid of the breeding sites, [then] you get rid of the mosquitoes. So, our interest then, is trying to figure out how exactly the exposure to the endocrine disruptors affect[s] virus transmission.”



Dr. Anderson appeared on the Contagionlive website.

See more at: <http://www.contagionlive.com/videos/understanding-mosquito-epidemiology-aids-in-vector-eradication-process#sthash.DxR1hJfi.dpuf>

Contagion™ is a fully-integrated print and digital news publication that provides practitioners and specialists working in infectious disease with up-to-date disease-specific information designed to improve patient outcomes and positively impact the identification, diagnosis, treatment, and prevention of infectious diseases.

BIOLOGY STUDENTS AND FACULTY STUDY MONGOOSE DIET IN US VIRGIN ISLANDS

In mid-May, Associate Professor Karen Powers and RU Biology students travelled to the US Virgin Islands (USVI) to study the diet of the Small Indian Mongoose. As an invasive, omnivorous predator on St. John (USVI), the Small Indian Mongoose (*Herpestes auropunctatus*) is capable of severely impacting the native populations of birds, reptiles, and invertebrates on the island. The animals were weighed and measured, and photos of their teeth were used to estimate age (via tooth wear).

Fur also was collected for stable isotope analyses - a procedure that can be used to determine diet "preferences" for the life of that hair.



Students Shane Brandes, Keifer Titus, and Heather Custer shaving fur from a captured mongoose. The fur sample can be analyzed to infer diet in this individual.



The first of 50 captured Small Indian Mongoose during the trip.

The animals were captured in live traps (Tomahawks), which were baited with scraps from the crew's meals. As an omnivore, mongoose could be captured using nearly any type of human food items as bait.



A captured mongoose.

These weasel-like animals weigh 300-850 grams, and can live 4 or more years in the wild.

Introduced to the Caribbean to control the invasive black rat (*Rattus rattus*) populations, they did little to curb the rat populations. Rats are nocturnal, while mongoose are diurnal.



The team works together to remove a mongoose safely from the trap.

Dr. Powers has been studying mongoose on St. John since 2008, typically working with students in the Tropical Field Biology course. This work has resulted in two research publications with RU biology students as co-authors. This current study will be submitted for publication in 2017, with all crew members as co-authors.

This research project is a collaborative project with Virginia Military Institute. Collaborator Dr. Pieter deHart is currently using stable isotope analyses (carbon-13 and nitrogen-15) to infer diet.

This project was funded by a College of Science and Technology Faculty Research Grant awarded to Dr. Powers.



Pictured are Keifer Titus, Heather Custer, and Karen Powers (with sleeping toddler Powers).

SCI ALTERNATIVE SUMMER BREAK – RU STUDENTS AND FACULTY CONDUCT RESEARCH WITH THE US FOREST SERVICE ON APPALACHIAN MEDICINAL PLANTS

In June 2016, 15 Radford University students worked with Dr. Christine Small (Biology) and Dr. Jim Chamberlain and Matt Winn (USDA Forest Service) to conduct research on sustainable management of black cohosh in George Washington-Jefferson National Forests.



Radford University students joined with Dr. Christine Small and members of the USDA Forest Service for their project.



Brayden Manchester and Diego Kendall

Black cohosh is a native plant harvested extensively from Appalachian forests and sold worldwide for medicinal uses. This research was supported by grants from the RU Scholar Citizen Initiative (SCI) and the USDA Forest Service, Southern Research Station.

Student researchers harvested roots and rhizomes of black cohosh, the part of the plant containing medicinal compounds. Data will be used to develop predictive models for root and rhizome biomass, to assist the Forest Service in developing conservation and sustainable management plans.



Amanda Harvey and Taylor Conyers