

FROM THE DEAN'S DESK – March 28, 2015

THE RADFORD UNIVERSITY COLLEGE OF SCIENCE AND TECHNOLOGY NEWSLETTER



Woodrow Wilson Visiting Fellow, Dr. Anthony Cortese meets with RU CSAT students and faculty to discuss the roles of the sciences in sustainability efforts

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WOMEN IN STEM FORUM ADDRESSES CHALLENGES AND EXPLORES STRATEGIES FOR SUCCESS

Radford University community members were invited to “Open their EYES” to women in STEM professions as a panel of professional and student scientists tackled some of the opportunities, challenges, and strategies for success that females face in science and technology fields. Students and faculty gathered in the Bonnie Hurlburt Student Center to engage in conversation related to gender issues in STEM. Featured panelists



Women in STEM panel

were Diane Catley, M.F.S. – Forensic Science Group Supervisor, Virginia Department of Forensic Science, Western District; Chelse Prather, PhD. – Assistant Professor of Biology, Radford University; Valerie Virta, PhD. - Scientific Editor at Medical Science & Computing; Emily Guise, '15 – a Biology major and undergraduate researcher; Matti Hamed '15 – also a Biology major and undergraduate researcher; Hanna Mitchell '17 – a Mathematics major and undergraduate researcher; and Sharon Roller '16 - an Anthropological Sciences major and undergraduate researcher. The panel was moderated by Dr. Donna Boyd, Co-Director Forensic Science Institute and Dr. Sara O'Brien, Assistant Professor of Biology.

The goal of the forum was to encourage women to seek STEM fields by identifying some of the challenges that are present and by forming strategies for moving beyond them.



Dr. Boyd sharing data regarding women in STEM fields

Dr. Boyd started the program with some demographics about women in STEM at Radford University, both as students and faculty. The numbers were fairly symmetrical with approximately 35 percent of each category represented by women. As she dug deeper into the data, figures were close together in some categories such as Anthropological Sciences, Mathematics, Biology, and Chemistry, but in the areas of Information Technology, Geology,

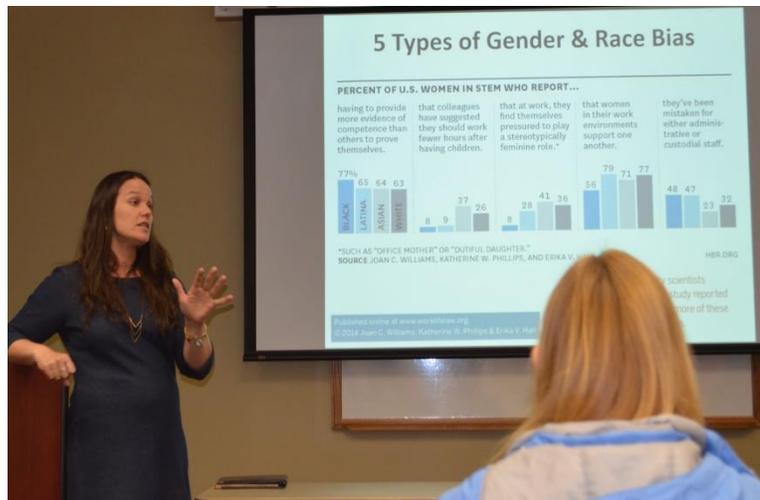
Physics and Geospatial Sciences, there was great disparity between women and men. These numbers are similar to those on a national scale and also translate to careers. “Some of the highest paying and in-demand jobs are in areas where women are not well represented” stated Dr. Boyd. “It is part of a larger global gender issue that we are facing where women don’t make as much money or own as much property.”

Dr. O'Brien followed up with some of the reasons why this might be happening including a “leaky pipeline” where women who study science at an early age might not continue through a college degree or beyond and also where women leave the workforce for a variety of reasons including family and less supportive work environments where even unconscious discrimination might be taking place. “We need

to encourage women at an early age” stated Dr. O’Brien. “We also need to keep supporting them as they progress through their careers.”

The panelists agreed and talked a little about what inspired them to pursue a stem related field, including positive support of mentors, family members, and teachers. “If a former mentor at one of my first jobs had not taken on that role and helped me in my first salary negotiation, I would have made nearly \$30,000 less” stated Dr. Verta. “I didn’t know what to ask for and I would have asked for less, but she helped me see my value.” Ms. Catley stated that she had seen a lot of things change since she started working in 1983. “At that time, almost everyone in my workplace was a man and their wives stayed home” she recalled. “Now while the numbers are a little more equal, there are still a lot of men in the field, but they have a greater understanding of the challenges and expectations of women in the workplace because their wives are working. It has started to even things out a little bit.”

Challenges of expectations of appearance were also addressed by the group with thoughts ranging from what was appropriate for field work to different recommendations for professional attire for job hunters. “When I was in the tropics for field research, it was a hot and humid environment, so I wore a tank top and was photographed with several elements of our research” stated Dr. Prather. “When my faculty partner submitted images from our work to a publication a few months later, they were rejected because the editors thought my attire would be distracting to male readers simply because I was wearing a tank top. I had to go through scores of photos with my male research partner to find one that would represent our work and would not be an issue. The fact that this was deemed important really floored me and I have since adopted a philosophy that I will wear what I want and if it is an issue, it is someone else’s issue.”



Dr. O'Brien discussed some of the prejudices women might face

Emily Guise pointed out that the gender inequity in appearance expectations was even present in some collegiate programs. “In a class, a faculty member asked us to dress professionally which meant a nice, button down shirt and appropriate pants for the guys, but the instructions for the women in the class were much longer including how to wear our hair, shoes, etc.”

Panelists agreed that it was a challenge, but that women should determine their own style personally and professionally with dress that is appropriate for the work they are doing and not let it be such an issue on their minds.

Rounding out the forum, Dr. O'Brien and Dr. Boyd started the conversation about how to develop strategies that could help overcome these issues. "Begin encouragement early and knock out negative stereotypes while women are young" stated Dr. O'Brien. "Encourage networking and leadership roles for women at all stages of life and encourage students to participate in undergraduate research." She added "These are all things that can help level the playing field."



Panelists shared their experiences with gender issues in STEM

Sharon Roller and Dr. Prather stressed the importance of mentors as an key part of success in STEM. Hanna Mitchell agreed and added "you need to develop a tough skin, be true to yourself and pursue what you are interested in, no matter

what someone else says."

Building on Hanna's statement, Emily added that "Women should develop confidence. It is important in scientific research but also in your career path." Dr. Verta continued that thought by adding "Learn to network and participate in informational interviews so that you will know about positions in which you are interested and the path to obtain them." Ms. Catley agreed that networking and "one on one contacts were important to take advantage of." Matti Hamed summed up her thoughts by stating "Use empowering words for others and pursue your goals, but don't forget to have fun."

The event was a Radford University Women's History Month Event sponsored by Women's Studies and the College of Science and Technology

RADFORD UNIVERSITY HOSTS BLUE RIDGE HIGHLANDS REGIONAL SCIENCE FAIR



Dr. Christine Small, chair of the RU Department of Biology, learns more about a student's project during the science fair

On Saturday, March 7, 2015, Radford University served as the host to dozens of students from across Southwest Virginia as the 24th Annual Blue Ridge Science Fair was held. Science fairs have roots that go back to the 1940s, when they were used to encourage talented high school seniors to pursue a career in science or engineering and to expose the public to scientific work. Today, science fairs are still used to nurture an interest in the sciences, but have expanded to include younger students. This event is sponsored by the Department of Chemistry and the College of Science and Technology along with a number of additional partners. Co-Directors of the event are Dr. Christine Herman and Dr. Kimberly Lane, both of the RU Department of Chemistry.

First Place winners in each individual senior category received an invitation to participate in the Virginia State Science and Engineering Fair at Virginia Military Institute on March 27 - 28, 2015.

Grand Award winners (the top two Senior Division projects) receive an all-expense-paid trip to the International Science Fair in Pittsburgh, PA on May 10 - 15, 2015.

Additional awards are supported by organizations such as the American Chemical Society, the American Meteorological Society, the National Weather Service, the US Air Force, Intel Corporation and many others.



2015 Grand Award Winners Emily Llaneras, Ashley Jordan, and Austin Owen

Through poster displays and oral presentations, young scientists present the results of their hard work in the fields of animal science, behavioral and social science, biochemistry and chemistry, cell and molecular biology, computer science, earth and planetary science, environmental management and science, engineering, mathematics, medicine and health, microbiology, physics and astronomy, and plant science. Participants in this fair represent the counties of Bland, Buchanan, Carroll, Dickenson, Giles, Grayson, Lee, Montgomery, Pulaski, Russell, Scott, Smyth, Tazewell, Washington, Wise, Wythe and the cities of Bristol, Galax, and Norton. Students will compete in either the Junior (6th through 8th grades) or Senior (9th through 12th grades) Division.

For more information, please visit: <http://sciencefair.asp.radford.edu/>

RU FORENSIC SCIENCE INSTITUTE IN THE SPOTLIGHT ON CAMPUS AND AT A NATIONAL CONFERENCE

For the past fifteen years, Donna and Cliff Boyd have been providing great service to Southwest Virginia, the entire Commonwealth and beyond as co-directors of the Radford University Forensic Science Institute. Much of the work of these scholars was showcased during two programs over the last six weeks.



On March 3 at 7pm in the Bonnie Hurlburt Student Center Auditorium, Dr. Donna Boyd presented "Inside the RUFISI: Serving the Commonwealth through forensic science, casework, research and education" as a part of the Museum of the Earth Sciences lecture series. During the program Dr. Boyd eminent professor of anthropology shared some of the work she has done in more than 150 RUFISI cases and consultations.

As one of only 70 certified Diplomats of the American Board of Forensic Anthropology, Dr. Donna Boyd also works in the Western Regional Office of the Virginia Chief Medical Examiner which is responsible for determining the cause and manner of deaths in 22 counties west of Roanoke.

The work is not quite what is glamorized on television, but it does have state of the art components. "I don't carry a gun, I don't wear halter tops and I don't work with a digital holographic machine," said Dr. Boyd, but she and the RUFISI team do use ground-penetrating radar, digital microscope, x-ray machines and a ballistic comparison microscope to research how long someone has been deceased and how they died.



Donna Boyd delivering her presentation as a part of the Museum of the Earth Sciences Lecture Series

Dr. Boyd specifically applies her knowledge of osteology, the scientific study of bones, to actual cases. "When I look at you I see your skeleton," she told the nearly 200 students, faculty and guests in attendance. "Bones can tell a person's health, weight, build, diet, birthplace, occupation and handedness."

Among the different kinds of cases on which she and the RUFISI team work are law enforcement consults, forensic searches and excavation of covert burials. Skeletonized, fragmented, burned and traumatized bones are part and parcel of a forensic anthropologist's job. The nature of the work is hard, and she talked about how she resists the gallows humor and grimness that comes with dealing with the results of man's cruelty to his fellow man or nature's fury.

"I have to be as scientific as I can. To be objective, I have to focus on the science," she said.

In spite of constant exposure to the results of violent trauma, the scientific process entailed in her field stimulates Dr. Boyd. "It is applied science and to see it in real life and learn from the immediate feedback is a self-correcting process. How science works can be astonishing."

In February, Cliff and Donna Boyd co-moderated a wide-ranging symposium at the 67th annual meeting of the American Academy of Forensic Sciences (AAFS) in Orlando.

To start the session devoted to application of theory to forensic anthropology, the Boyds, co-directors of the RU Forensic Science Institute, presented a paper titled, "Theory in forensic anthropology: a retrospective and look forward." The paper recapped the Boyds' review of over 500 research studies dealing with forensic anthropology over 20 years to demonstrate the discipline's strong scientific basis.

Later in the session, the Boyds joined a colleague, William Baden, to present a paper titled "Non-linear systems theory and its application to the assessment of post-mortem interval." The paper presented their alternative perspective on the linear theoretical model of determining the post-mortem interval or "time-of-death" and since used data drawn from body farms to simulate decay.

Representing more than 6,000 physicians, attorneys, dentists, toxicologists, physical anthropologists, document examiners, psychiatrists, physicists, engineers, criminalists, educators and digital evidence experts from the United States, Canada and 66 other foreign countries worldwide, the AAFS is a professional society dedicated to the application of science to the law and the elevation of accuracy, precision and specificity in the forensic sciences.

"Forensic anthropology is a young discipline and now is the time to address these issues," said Donna Boyd, who added that a solid theoretical basis for the discipline would benefit the criminal justice system.

"It is frustrating to be before a jury and have evidence disallowed because the judge questions the science," she said. "Work toward a scientific foundation of forensic anthropology will solidly underpin our credence as expert witnesses."

Cliff Boyd said forensic technology, especially DNA, is exerting a powerful influence on the discipline.

"Technology is developing along lines that can be very beneficial to the field," he said. "We need to be direct and discuss the many issues about the discipline now because the future of the discipline depends upon what happens now."

Learn more at www.radford.edu/fsi



Donna and Cliff Boyd

Don Bowman contributed to this story

SUSTAINABILITY AND THE SCIENCES WITH WOODROW WILSON VISITING FELLOW

“Sustainability is not just about the environment, it is about continuing to do something positive on a regular basis to meet the current needs of people without compromising future generations” stated Dr. Anthony Cortese, Woodrow Wilson Visiting Fellow and President of Second Nature for Education, as he opened a forum with College of Science and Technology students and faculty on March 25.



Dr. Anthony Cortese

Dr. Cortese, a long-time advocate of sustainable development and promotion of best practices for college and university campuses in managing their growth and activity in a responsible manner, gave the assembled group a brief history lesson regarding the sustainability movement. “Traditional economic development of the mid-Twentieth Century was causing a problem with environmental pollution and degradation” he said. “By the 1970s and 80s, we knew we needed to do something and we began with a program at the United Nations.” Dr. Cortese helped to establish an organization dedicated to bringing about sustainable development called Second Nature along with current Secretary of State John F. Kerry and others.

Much of their effort has been geared toward work on college campuses both in terms of the way the institutions grow and operate and in the thoughts and minds of students and the campus communities. “We need to publicize what is happening” stated Dr. Cortese. “In fact Radford University has made a commitment to go ‘carbon neutral’ by 2040 and many if not most of you don’t know about it. These are the positive steps we need to communicate to others and enhance what we do.”



Dr. Cortese met with RU CSAT faculty and students.

Dr. Sara O’Brien, who has been teaching a class entitled Science and Society, along with Dr. Jake Fox, who has been teaching Human Impacts on the Prehistoric Environment, helped raise issues that they have been discussing in their classes and both had a number of students from these classes in attendance.

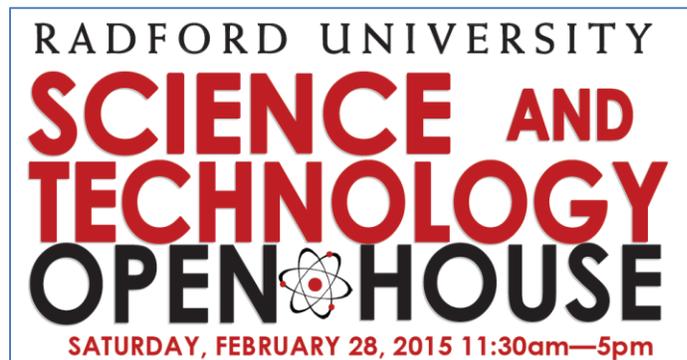
Challenges were also discussed for those in the sciences moving forward. “For many years, scientists have been attacked in the press and other media because certain interest groups are not in favor of what the science is bringing forward” said Dr. Cortese. “These attacks on science undermine our ability to exist and you as the future of science must be prepared to communicate about your work and to challenge these biased views with peer reviewed material.” He recommended the book *Merchants of Doubt* by Naomi Oreskes as an excellent reference as to how scientists have had to deal with such problems in the past.

The program concluded with some advice from Dr. Cortese “Those of us in the sciences must show what has happened in the past and is happening now and the consequences of those actions. It is only through that effort that we as a society can work with nature and not against it.”

STUDENTS FROM ACROSS VIRGINIA COMPETE IN RU CYBER SECURITY CONTEST

The Radford University Department of Information technology hosted a state level cyber security “Capture the Flag” contest during the week of March 23-27th. More than 50 high school students competed virtually in this program from Thomas Jefferson School of Science and Technology, Mountain Vista Governor's School; Shenandoah Valley GS, Southwest Virginia GS, Radford High School and Stone Bridge High School. Participants had to successfully navigate problems to “capture a flag” and win points in the event sponsored and partially funded by the National Security Agency (NSA) and Cyberpath. RU contest organizers were faculty and students in the Department of Information Technology, Dr. Prem Uppuluri, Dr. Joe Chase, Dr. Jeff Pittges, Michael Ramos and Danielle Capezzuto. Contests like this help prospective students become more proficient in cyber security skills and to also learn more about the RU program elements.

CSAT OPEN HOUSE HELD FEBRUARY 28



More than 200 new members of the Radford University family participated in the annual College of Science and Technology Open House on Saturday, February 28.

Students who have an interest in attending Radford University to pursue a major in science or technology were invited to tour the campus and CSAT facilities such as the

Greenhouse, Museum of the Earth Sciences and the Planetarium. Prospective students and their families also had the opportunity to learn more about career services, student leadership and research opportunities and more.

ANTHROPOLOGY CLUB SPECIAL PRESENTATION BY DR. JOHN VERANO FROM TULANE

On Tuesday, April 2 at 5pm in Russell Hall 113, Dr. John Verano from Tulane University will be discussing the largest child and camelid sacrifice known from the new world with a focus on what new analytical methods in stable isotope geochemistry can tell scientists. This event is sponsored by the Anthropology Club, the Department of Anthropological Sciences and the RU Club Programming Committee.

DISAPPEARANCE OF LOCAL LAKE FEATURED IN MUSEUM OF EARTH SCIENCES LECTURE

Radford University Geology Professor Skip Watts and Geology Lab Coordinator George Stephenson will review the case of the disappearing Mountain Lake in the final Museum of the Earth Sciences Lecture for Spring 2015 on April 7, at 7 p.m. in the Hurlburt Student Center Auditorium. The lecture is free and open to the public.

Dr. Watts and Mr. Stephenson will recap the high-tech research into the geology of the ancient lake that they, along with RU geology students, have explored using a remotely operated submarine, sonar, electric resistivity, quad copters, seismic mapping and flow monitoring.

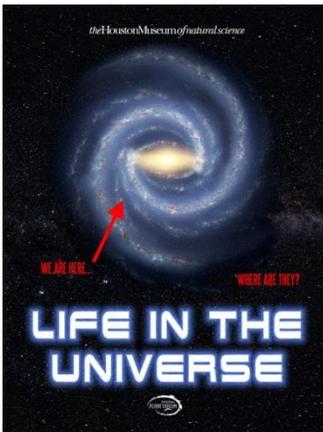


Mountain Lake

The Radford University Museum of the Earth Sciences is part of the department of geology in the College of Science and Technology and an affiliate of the Virginia Museum of Natural History. The museum serves as an educational resource for earth science-related themes for the university, K-12 communities and the general public. It is open from October through November and from January through April while RU is in session.

To learn more about the Museum of the Earth Sciences, please visit www.radford.edu/mes

QUESTIONS OF DINOSAURS AND ALIEN LIFE ARE FEATURED AT THE RU PLANETARIUM



The RU Planetarium shows through April 24 at “Search for Life in the Universe” on Tuesday and Thursday evenings at 7:30pm, and “Dinosaur Prophecy” on Saturday mornings at 10:30am. The planetarium is located on the ground floor of Curie Hall, in room 43A.

In 1960, astronomer Frank Drake used a radio telescope in Green Bank, West Virginia to listen to two nearby stars. He heard nothing interesting, but the idea of searching for life beyond Earth was born. “Search for Life” takes a fresh look at this fifty-year-old question, looking forward from the big bang, in search of those special places that might harbor life, including all of the planets in our solar system.

Long before dinosaurs' massive extinction 65 million years ago, many individual species simply disappeared. Through “Dinosaur prophecy” you can visit dinosaur graveyards, study their bones, and reconstruct how these creatures lived and died to solve four famous cold cases from the age of the dinosaurs in The Dinosaur Prophecy.

For more information, please visit www.radford.edu/planetarium

CAMP INVENTION AT RU SCHEDULED FOR JUNE



Camp Invention is a nationally recognized, non-profit elementary enrichment program backed by the National Inventors Hall of Fame.

Over the past 40 years, and in partnership with the U.S. Patent and Trademark Office, the Camp Invention program has encouraged nearly two million children, teachers, parents, college students and independent inventors to explore science, technology and their own innate creativity, inventiveness and entrepreneurial spirit.

Kids from the first through sixth grades can participate in Camp Invention at RU this June 22 – 26. Local educators will serve as faculty to lead the week of hands-on fun at Radford University, sponsored by the College of Science and Technology.

Registration is now open. For more information, please visit:

<http://inventnow-web.ungerboeck.com/programsearch/moreinfo.aspx?event=12027>

SUMMER BRIDGE APPLICATION DEADLINE EXTENDED FOR SELECT TRACKS

The Radford University College of Science and Technology Summer Bridge STEM program is a week-long residential experience for rising sophomore, junior, and senior high school girls interested in science, technology, and mathematics. The 2015 edition of the program will take place from Sunday, July 12 – Friday, July 17, 2015. More than 70 students have already been accepted into the program, but due to the generous donors of the program, additional scholarships are available for select tracks.

More information and application instructions are available at:

<http://www.radford.edu/content/csat/home/summer-bridge.html>

