

FROM THE DEAN'S DESK – January 23, 2015
THE RADFORD UNIVERSITY COLLEGE OF SCIENCE AND TECHNOLOGY NEWSLETTER



RU Biology Students in front of a Banyan tree at the Society of Comparative Biology Meetings in West Palm Beach Florida.

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RU PROFESSOR AND AUTHOR MEETS WITH WORLD LEADER

Dr. Grigory Ioffe from the RU Department of Geospatial Science met with Belarus President Alexander Lukashenko over the winter break. Learn more here:



Dr. Grigory Ioffe with Belarus President Alexander Lukashenko

On January 12, Dr. Grigory Ioffe met with Belarus President Alexander Lukashenko and discussed some of the RU professor's work regarding the country. President Alexander Lukashenko is the controversial four-term Belarusian national leader of this Eastern European country near the conflict between Ukraine and Russia. "Belarus is an intermediate country straddling East and West with a lot of blurred cultural borders," Dr. Ioffe says. "It is a nitty-gritty reality."

During the meeting, President Lukashenko noted that the opinion of an objective and interested expert from outside like Grigory Ioffe is important for the evaluation of the current situation in Eastern Europe. "It is very important for us, especially in this challenging period of uneasy relations not only of Belarus and the West, but also of the states located in Eastern Europe. It is important because of an array of problems which have recently escalated in Ukraine, in Belarus, in Russia. These include economic crises and other issues," the President said.

"Your reasoning, your assessment of the situation in Belarus are very important, both for the international community and for the understanding of the processes which are happening here today," President Lukashenko stated to Dr. Ioffe.

Dr. Ioffe's most recent publication "Reassessing Lukashenko: Belarus in Cultural and Geopolitical Context," was featured during Geography Awareness Week last November on the Radford University Campus.

You can learn more about Dr. Ioffe's work at his webpage: <http://gioffe.asp.radford.edu/>

RU STUDENTS PRESENT ARCTIC RESEARCH AT AMERICAN GEOPHYSICAL UNION MEETING

In December, a team of students who participated in the 2014 RU Arctic Expedition to Barrow Alaska traveled to San Francisco with Dr. Rhett Herman for the American Geophysical Union meeting to share their findings from their polar ice research. Team member Jordan Eagle won an “SPS reporter” scholarship to attend the meeting which required her to submit her perspective on the meeting and entered her into the nationwide competition for having reports potentially featured on the national Society of Physics Students (SPS) website. Not all of the submitted reports were listed, but Jordan received the top spot on the Society of Physics Students site:

<http://www.spsnational.org/meetings/reports/>

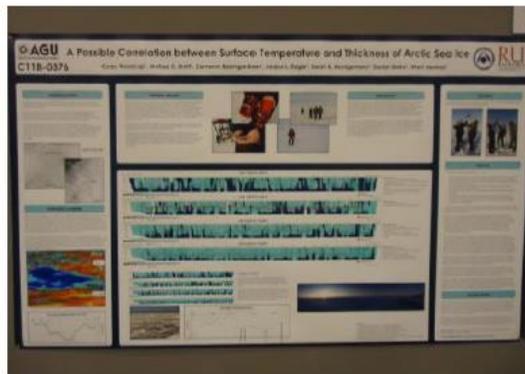
Radford University Takes on American Geophysical Union Meeting

American Geophysical Union 2014 Fall Meeting December 15-19, 2014, San Francisco, CA

By Jordan Eagle, Radford University

I am a third-year physics student at Radford University, treasurer of the SPS chapter, and a student researcher on an ongoing Arctic sea ice project that was presented at the American Geophysical Union (AGU) 2014 Fall Meeting. The research began in an Arctic geophysics course offered every other year at Radford that takes students to the northernmost city of the United States: Barrow, Alaska. Here, the class conducts onsite research studying the correlation between the surface temperature of the Arctic sea ice and its thickness. The purpose of the trip is to establish whether or not a correlation is present. A correlation would enable researchers to study larger areas of the ice in shorter amounts of time and with more cost-effective methods and geophysical equipment.

This work brought two SPS members and three others from Radford to the AGU fall meeting, where we presented our research in the poster hall’s “Cryosphere” section. AGU is one of the largest conferences in the nation. Some 20,000 members attended to see presentations, keynote speakers, exhibitors, and university representatives, just to highlight a few attractions. Among these members were people from all over the world presenting their research. Many of the students were graduate students presenting research that pertained to their Ph.D. As for Radford University, we were one of the few schools that brought undergraduates and a couple of alumni (one graduated in May and the other just this fall semester).



Left: Members of the Radford polar ice research team (L-R): Melissa Brett, Jordan Eagle, Corey Roadcap, Cameron Baumgardner, and Sarah Montgomery in front of their AGU poster presentation.

Right: A close-up of the poster.

I had the opportunity to speak with many people conducting research in many different fields. From radioactive elements to heliophysics to pollution in the Chesapeake Bay, people were talking about research on really everything under the sun (pun intended). I also had a chance to speak with people who are doing research similar to mine that was sometimes conducted in the same area. Being able to compare results and share data among other student researchers was new to me, and it was interesting to hear information about the Arctic sea ice that was unbeknownst to me beforehand. As a scientist, being able to make changes to ongoing research in order to incorporate new information learned by other scientists is crucial. AGU can be a great place to do this.

An exhibit area held a variety of vendors including Google, NASA, Geometrics, Sandia National Laboratories, Amazon, Microsoft, and also universities such as Vanderbilt, China University of Geosciences, University of Utah, Johns Hopkins University, and Louisiana State University, just to name a few. These vendors showcased new technology, gave talks on topics like updated global climate models (NASA), shared new information and software, and provided possible career paths into graduate school or new careers. I was introduced to new software that was absolutely breathtaking. It was developed by NASA and is called "Eyes of the Solar System." It is an accurate video game-like computer model of the solar system. Users can observe the solar system as it is in real time and view any occurrences within the solar system from 1950-2050, including tours of the past and present. Other features include a 3-D view of the software as well as tons of available information about any known object in the solar system. You can even view Voyager 1 in real time!

The meeting also featured a career center for younger scientists like myself where we could explore possible internship opportunities as well as future career paths. Programs like NASA's DEVELOP had spokespeople there to encourage students to always seek new research opportunities.

Poster presentations took place consistently throughout the conference; thousands were set up at a time. I spoke with another undergraduate, Kathryn McKeough from Carnegie Mellon University, who did extensive research on the sun's corona trying to create algorithms that can correctly and successfully define substructures of coronal loops involving nanoflares and Alfvén waves. Using the Hi-C (High Resolution Coronal Imager) can reveal visible substructures that may cause coronal heating. She focused mainly on the nanoflare heating process.

I sat in on a few talks that were about the atmosphere of Titan. Leading scientists working with the Cassini spacecraft had a plethora of data about Titan's surface and atmosphere that involved the observation of the seasonal evolution of the vortices at either pole over a span of ten years. I also heard from two keynote speakers on Titan, Stephanie Le Mouélic and Baptiste Rousseau of LPGN (Laboratoire de Planétologie et Géodynamique de Nantes) in France. They observed polar storms that enabled them to compute global maps of Titan. This study provides insight into the evolution of the north polar cloud that was not available before, and also provided new information on the active polar storm that is growing over Titan's south pole.

This was the first AGU meeting I have attended and it was absolutely amazing to see scientists from all over the world networking and sharing data, new information, and ideas. There were thousands of

people who had gathered to contribute various ideas and results that are shaping the future of science right now. The technology and knowledge that were spread at the meeting are constant reminders of how far humanity has come as an intelligent species. Conferences like this enable science to move forward in the rapidly changing and ever growing industry it has become. I look forward to future meetings that can further indulge me in the new and profound knowledge of the world that I gained from the 2014 fall meeting. I recommend and encourage every student to find opportunities like this that will nourish you in knowledge and experience and the company of colleagues and fellow scientists.

RU PROFESSOR PUBLISHED IN ROYAL SOCIETY JOURNAL



Dr. Laura Gruss

Dr. Laura Gruss, Assistant Professor of Biology at RU has had her work published in *“Philosophical Transactions B”* a publication devoted to a specific area of the biological sciences. These areas define research frontiers that are advancing rapidly, often bridging traditional disciplines. In 2014, Dr. Gruss was invited to go to London and present a paper at a conference of the Royal Society. The manuscript resulting from that presentation is what has now been published to reach a wider audience.

The issue is titled 'Human evolution: brain, birth weight and the immune system' and is edited by Graham J. Burton, Ashley Moffett and Barry Keverne.

More details about this publication can be found at <http://rstb.royalsocietypublishing.org/content/human-evolution-brain-birthweight-and-immune-system>

The article by Dr. Gruss is titled 'The evolution of the human pelvis: Changing adaptations to bipedalism, obstetrics, and thermoregulation.' A free copy of the article can be downloaded at:

PHILOSOPHICAL TRANSACTIONS B

rstb.royalsocietypublishing.org

Review

Cite this article: Guss L, Schmitt D. 2015 The evolution of the human pelvis: changing adaptations to bipedalism, obstetrics and thermoregulation. *Phil. Trans. R. Soc. B* 370: 20140063. <http://dx.doi.org/10.1098/rstb.2014.0063>

One contribution of 13 to a discussion meeting issue 'Human evolution: brain, birthweight and the immune system'.

Subject Areas:
biomechanics, evolution

Keywords:
human evolution, pelvis, bipedalism, functional anatomy, birth

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The evolution of the human pelvis: changing adaptations to bipedalism, obstetrics and thermoregulation

Laura Tobias Guss¹ and Daniel Schmitt²

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The fossil record of the human pelvis reveals the selective priorities acting on hominin anatomy at different points in our evolutionary history, during which mechanical requirements for locomotion, childbirth and thermoregulation often conflicted. In our earliest upright ancestors, fundamental alterations of the pelvis compared with non-human primates facilitated bipedal walking. Further changes early in hominin evolution produced a platypelvic birth canal in a pelvis that was wide, round, with flaring ilia. This pelvic form was maintained over 3–4 Myr with only moderate changes in response to greater habitat diversity, changes in locomotor behaviour and increases in brain size. It was not until Homo species evolved in Africa and the Middle East 200,000 years ago that the narrow anatomically modern pelvis with a more circular birth canal emerged. This major change appears to reflect selective pressures for further increases in neonatal brain size and for a narrow body shape associated with heat dissipation in warm environments. The advent of the modern birth canal, the shape and alignment of which require fetal rotation during birth, allowed the earliest members of our species to deal obstetrically with increases in encephalization while maintaining a narrow body to meet thermoregulatory demands and enhance locomotor performance.

1. Introduction

The human pelvis is a remarkable structure that plays a central role in many critical biological processes, most notably bipedal locomotion, thermoregulation and parturition (childbirth). Each of these processes is essential enough to survival and reproductive success as to be under strong pressure from natural selection [1–4]. As a result, the fossil record of the evolution of the human pelvis over the past 4.5 Myr reveals a profound story concerning selective priorities during different phases of human evolution, and elucidates the essential constraints that formed our modern anatomical condition.

Pelvic anatomy impacts human performance. To walk upright in an energetically efficient manner with a minimal risk of injury, the pelvis must be robust and have a shape that maximizes muscle lever arms and minimizes load [5–11]. The ability to regulate body temperature is affected by the width and depth of the pelvis, which plays a crucial role in determining overall body proportions and the body's surface area-to-mass ratio, thereby influencing heat loss through the body's surface [12,13]. Finally, and most critically from a selective stand-

<http://rstb.royalsocietypublishing.org/cgi/reprint/rstb.2014.0063?ijkey=eC0zvI5ypewFWYw&keytype=ref>

RU BIOLOGY MAJORS PRESENT RESEARCH AT NATIONAL MEETING



RU Students from the Ecophysiology Lab attending the Society for Integrative and Comparative Biology annual meeting January 3-7, 2015 in West Palm Beach, FL. RU Students pictured are Caitlin Linville, Monica Kaur, Jordan Hamden, Emily Guise Guise and Katharyn Self with a friend from the conference.

Five RU Biology majors presented their research at the national meeting of the Society for Integrative and Comparable Biology Jan 4th and 5th in West Palm Beach, Florida. These students, representing the RU Ecophysiology Lab, held the following poster sessions:

Emily Guise, mentored by Dr. Sara O'Brien, presented: Trouble with trenbolone? Examining the influence of a common run-off pollutant on *Gambusia holbrooki* development and behavior.

Katharyn Self, mentored by Dr. O'Brien, presented: Exploring the synergistic effects of estrogen-mimicking endocrine disrupters on the physiology and behavior of *Gambusia holbrooki*

Caitlyn Linville and Monica (Mandeep) Kaur, mentored by Dr. Jason Davis, presented: The Effects of Vespa Amino Acid Mixture on Swimming Endurance of *Musca domestica*

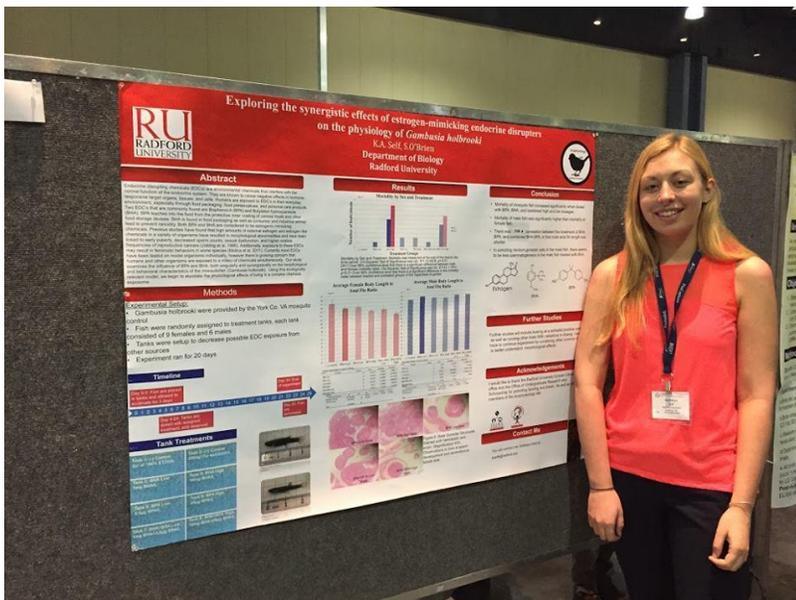
Jordan Hamden, mentored by Dr. Davis and Dr. Joy Caughron, presented: Measuring immunocompetence of free living, non-model passerines using a novel BKA

“Being able to attend the SICB conference as undergraduates has really helped my students prepare for their future goals as graduate students in graduate programs or professional programs” stated Assistant Professor of Biology, Dr. Sara O’Brien. “Having the opportunity to network with luminaries in the field to explore the possibilities of graduate work with them as well as to gain valuable feedback on their research projects is quite special and unique for undergraduates.”

In fact, several of the students were thought to be much further along in their educational journey. “Many of the RU students who presented their research at SICB were asked if this was their thesis research as if they were already in graduate programs” recalls Dr. O’Brien. “This illustrates that the at the opportunities and accolades RU students gain from participating in undergraduate research is very well respected in the greater scientific community. “



Students at the National SICB meeting had the opportunity to visit some of the interesting flora in the area.



Katharyn Self, mentored by Dr. O'Brien, showcasing her research.

Their research was funded by the OURS program (travel grants and SURF awards), the Scholar Citizen Initiative program (travel funding and HIA award) and the Department of Biology Research Awards.

RADFORD AMAZONIAN RESEARCH EXPEDITION TEAM ANNOUNCED

Assistant Professors of Biology Jason Davis and Joy Caughron will be leading a team of twelve students on a research expedition to Peru during Maymester 2015. The students who are part of the inaugural Radford Amazonian Research Expedition (RARE) have been announced in groups with their general areas of research.

Microbiology: Cassie Bonavita
Steve Gallas
Hanna Mitchell

Botany: Will Dowd
Emily Guise
Josh Oliver

Invertebrates: Jessi Basham
Skyler Carrell
Diego Kendall

Vertebrates: Caitlin Annear
Sarah Hebert
Fallon Parker

Biomedical: Michelle Maurer



The rainforest along Las Piedras river.

Over the course of the Spring 2015 semester, these students will further develop their research projects prior to leaving for the Amazon in May.

The RARE team benefits from the diversity of majors of the students who are participating. From math to geospatial science to physics to biology, many different areas of the sciences will be represented and studied in Peru.

The team will leave May 17 and return June 7, 2015, and spend their time in the Madre de Dios River region that lies at the headwaters of the Amazon River at the Las Piedras Biodiversity Research Station. They will be under the guidance of Tamandua Expeditions, which focuses on biodiversity research, conservation and responsible volunteer/adventure travel.

One aspect of the RARE program will be the sharing of the research activities and student stories via social media and the expedition webpage - <http://www.radford.edu/rainforest>. Over the course of the spring semester, we will learn more about each of the participants weekly and gain a greater understanding of their research goals.

For more information about RARE, contact Davis at jdavis319@radford.edu or 831-5353.

RU OBSERVATORY LAUNCHES SOCIAL MEDIA SITE



The RU Observatory at Selu

A treasure of the Selu Conservancy is the RU Observatory, located in what appears to be a grain silo adjacent to a barn. Inside, visitors find a look at our celestial neighbors is available rather than cattle feed. To help the RU Community and surrounding area learn more about the activity at the observatory, a new social media site is now available via Facebook.

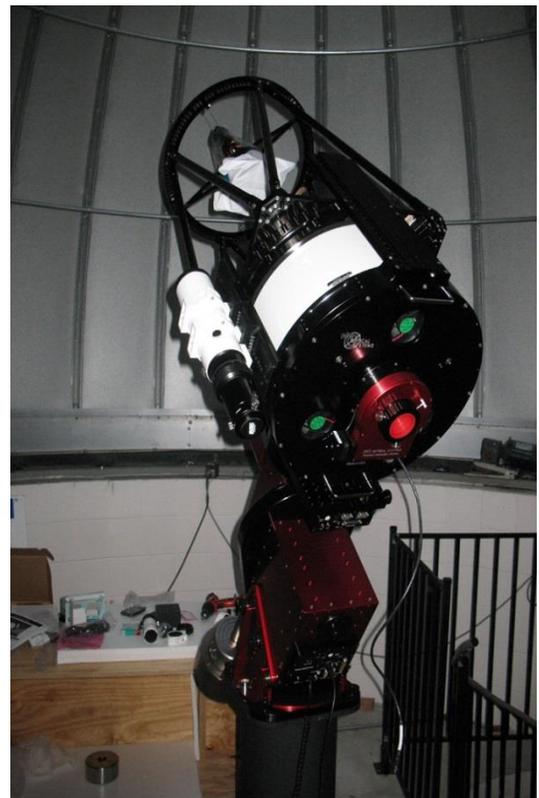
“Social Media will be a great help in spreading the word about this wonderful resource for the sciences at RU” stated Director of the Observatory, Jack Brockway. “Come join us for a tour of the heavens.”

The observatory makes the planets, stars, comets, and other celestial bodies immediately accessible to view. It allows researchers to investigate the dynamics of the universe, and it allows interested amateurs to see first-hand the intriguing objects in space that affect tides, weather, seasons, and other aspects of our lives. School children, college students, and the general public can gain exposure to technology that will help them develop an interest in science.

To visit the RU Observatory at Selu, plan a visit on a clear Friday night when RU is in academic session. Tours begin at 8pm and are free and open to the public, however space is limited. Learn more and get updates on the observatory when you like the new Facebook page by visiting:

<https://www.facebook.com/pages/Radford-University-Observatory-at-Selu/428475123983659>

You can also visit the Observatory website at www.radford.edu/observatory.



Observatory telescope

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 and participants who sign up by February 16 can save \$35.

For more information, please visit:

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

SUMMER BRIDGE APPLICATIONS REQUESTED BY THE COLLEGE OF SCIENCE AND TECHNOLOGY

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.

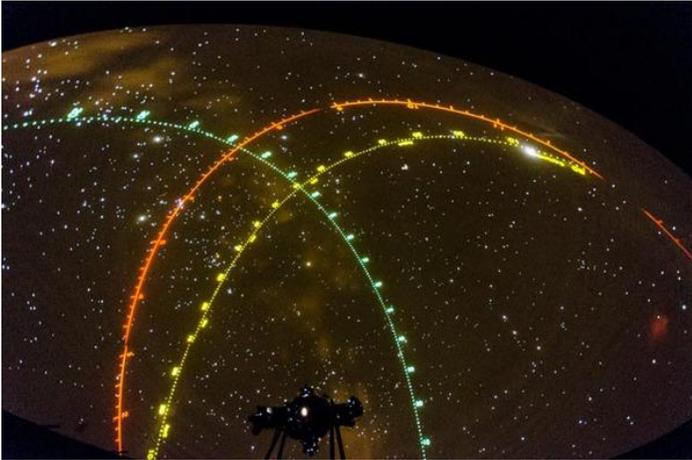


Applications are now being accepted for the 2015 program.

More information is available at:

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

RU PLANETARIUM ANNOUNCES JANUARY AND FEBRUARY 2015 SHOWS



RU Planetarium dome photo by Tom Cerul

Currently the RU Planetarium is offering a virtual tour of the night skies each Tuesday and Thursday at 7:30pm until the end of January. The first Saturday kid's show will be on January 31 at 10:30am.

All of the shows from Jan 31-Feb 14 will include both a shorter Night Sky Tour as well as the full-dome show "It's About Time." In this show audiences go along with future tourists who ride a space elevator to a geosynchronous space station, and peer through the time-spanning Einstein

Space Telescope to the far reaches of our galaxy and beyond. This show is appropriate for all ages. "It's About Time" is produced by Discovery Dome.

RU MUSEUM OF THE EARTH SCIENCES SPRING HOURS AND LECTURE

The RU Museum of the Earth Sciences opens for the Spring Semester on January 26, 2015.

Hours are:

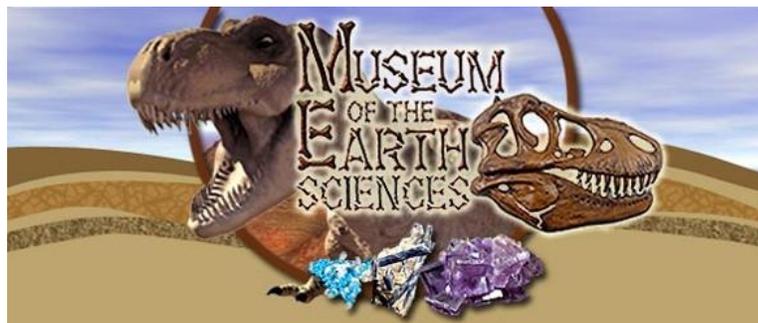
M 12:00 – 4:00

T 12:00 – 4:00

W 2:00 – 4:00

R 10:00 – 4:00

F 12:00 – 2:00



In addition to regular tours of the facility, The Museum of the Earth Sciences hosts a lecture series on the first Tuesday of each month during the academic year.



Painting of a plesiosaur on land, by Heinrich Harder

The first lecture for Spring 2015 will take place on Feb. 3rd at 7:00 p.m. in the Bonnie Hurlburt Student Center Auditorium. Our featured speaker is Christina Byrd, Paleontology Technician at the Virginia Museum of Natural History. Her presentation will be "The Journey to Understanding Plesiosaur Development and Growth".