



CUR BIOLOGY DIVISION
NEWSLETTER
FALL/WINTER 2015
DECEMBER 4, 2015



**NORTHERN KENTUCKY
UNIVERSITY PARTNERS
WITH UNIVERSITIES AND
NGOs IN SRI LANKA,
SUBMITTED BY KRISTI
HAIKK, NORTHERN
KENTUCKY UNIVERSITY**

In October 2014, I had the privilege of serving on a delegation to Sri Lanka with faculty from the College of Arts & Sciences, the Deans of Arts & Sciences and Informatics, our Provost, and friend of Biological Sciences, Dr. Carol Swarts. The purpose of this trip was to build partnerships between Sri Lankan universities and other non-governmental organizations (NGOs) that would enable many research, teaching and outreach projects to be developed. Why Sri Lanka? The history of Sri Lanka begins 30,000 years ago. It is roughly the size of West Virginia and has been colonized by the Dutch, Portuguese, and British over the last 200 years. It has recently come out of a 26 year long civil war, has 4 major religions including Buddhism and Muslim, and

is a main port for the world's busiest shipping lane putting Sri Lanka in the crossfire between China and the rest of the world. After making some connections with Sri Lankans interested in Biology and Environmental Science related collaborates in October, I wrote a grant to return to Sri Lanka in June 2015 to formalize these collaborations and begin work!

Our main outcomes from the June 2015 visit include writing 3 grants to fund undergraduate research in Sri Lanka on health-based initiatives; developing a faculty and student exchange program; and developing a Neuroscience and Meditation graduate certificate at NKU. NKU students will have the opportunity to do undergraduate research on issues in ecotoxicology & pollution management, molecular biology aspects of botany, as well as a type of kidney disease of unknown origin seen in small villages in Sri Lanka.

We are in the process of working out an exchange with Sri Lankan scientist from the University of Sri Jayawardenepura Department of Anatomy, to work with one of our faculty in the Spring.

As our Executive Director of the International Education Center, Dr. Francois Le Roy said of our exploratory efforts in Sri Lanka, "This is the greatest return on investment we have seen in our drive to advance internationalization on campus." The Department of Biological Sciences is at the forefront of internationalization.



Village of Madewachchiya Buddhist Monks, Provost Ott Rowlands, Windsor Kanakarathne (Sarvodaya), Kristi Haik and villager with CKDu in the foreground. ©Rudy Garns

EXPANDING ACCESS TO RESEARCH OPPORTUNITIES, SUBMITTED BY GRETCHEN EDWARDS-GILBERT, CLAREMONT COLLEGE

Scripps College, a women's college, runs an intensive multi-year pre-college program, Scripps College Academy (SCA), for high-achieving young women with limited resources who seek to become the first generation in their families to attend college. The Math and Science Scholars program is one example of the academic enrichment opportunities provided to SCA Scholars in the year-round programming. Each fall, SCA Scholars are invited to work in small groups in a laboratory setting with W.M. Keck Science Department faculty members to conduct and present research. Projects are diverse, allowing students to explore chemistry, biology, physics, computer science, mathematics, and/or psychology. Additionally, the student to faculty ratio of 6:1 provides a hands-on academic experience.

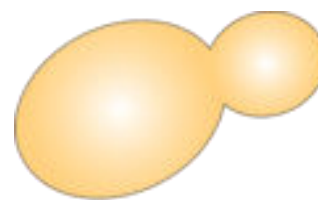
The Math and Science Scholars program consists

of four meetings between students and faculty, where experiments are conducted in the labs, and data is collected and analyzed. Students gain skills in designing an experiment by forming a hypothesis, observing and measuring the experiment in progress, writing results, and reporting on, evaluating, and supporting their findings. At the conclusion of the research sessions, students present their findings to their family, friends, and the Scripps College community in a symposium.

This fall, six high school students worked with my research technician and a junior undergraduate molecular biology major to study stress response in budding yeast, *Saccharomyces cerevisiae*. They studied a specific stress-response pathway, the unfolded protein response (UPR), which they monitored by looking at changes in gene expression using RT-PCR. With the guidance from my technician and undergraduate, the students learned sterile technique, how to purify RNA, set up reactions, and separate PCR products by

agarose gel electrophoresis. They quantified their results using an image analysis program, ImageQuant. More important than the technical experience, the students learned how to design and run controlled experiments based on a hypothesis. They gained confidence in their presentation skills and found out that working in lab can be both challenging and fun. One of the students expressed how surprised she was at the supportive, friendly nature of the lab, and how enthusiastic the undergraduate researchers are about their projects.

The Math and Science Scholars program provides the high school students with the opportunity to participate in original scientific research while giving undergraduates the opportunity to be scientific mentors to younger students.



**INTEGRATING
UNDERGRADUATE
RESEARCH INTO THE
CURRICULUM AT AUSTIN
COLLEGE, SUBMITTED BY
LANCE BARTON, AUSTIN
COLLEGE**

For more than a decade, integrating student research experiences into the curriculum has been a primary goal of the Biology Department at Austin College. During that time, several existing courses have been reimagined with new research project components and new courses framed around research projects have been developed. Additionally, the expansion of co-curricular opportunities for student research and presentations has helped to cultivate a culture of inquiry within the students of the department. This enhanced student involvement in research has recently spurred a new project by CUR Biology Councilor Lance Barton, Associate Professor of Biology at Austin College.

Barton, responding to the student body's interest in cancer biology, used preliminary data gathered by his independent research students to

develop a new project and a new course. With support from The Discovery Foundation, Dallas, TX, Barton was able to offer a new 300-level course in Cancer Biology that integrates novel research into the laboratory portion of the class. Students in the class (and during a summer research component) generate new cancer cell lines through mutagenesis that can be further characterized in the course. For each new cell line generated, students collect data on genetic and genomic instability, metastatic potential, and proliferative capacity, while also learning the biological mechanisms behind these phenotypes of cancer and delving deeply into the primary literature through classroom discussions. The students generate posters from their results in the course and present them in a public forum on campus, in addition to discussing their project with an invited speaker on cancer research. Additionally, interested students present this work in other on-campus venues and off campus at the Annual Meetings of the Texas Academy of Science and

the American Society of Cell Biology (ASCB).

Rose Massey, a senior biology major who completed Cancer Biology in the fall of 2014, stated that "Cancer Biology was a great integration of classroom learning and lab based research. Working on creating our own cancer lines and testing established lines was a wonderful way to integrate book knowledge with lab work." Massey was able to use this experience to develop a collaborative research project examining the effects of butyrate on cancer-related cell signaling, which has earned her travel awards from ASCB and CUR in 2015. Massey is using her experience as a launch point to graduate school in molecular biology. Tori Campbell, a junior biology major who worked on the project during summer 2015 stated that "Participating in an undergraduate summer research experience has been one of the highlights of my college career and education because I not only honed my skills in the lab, I became a more thoughtful and efficient scientist." Her partner,

Brandon Dang, added "I never expected that cancer biology research would engage me in learning about anatomy and physiology, cell biology, and mathematics." Dang, a junior biology major, also emphasized that "When I went through this procedure, I came to realize how small 10 weeks really is, and how little we know about cancer. You may discover a lot in those 10 weeks, but knowing that those 10 weeks won't tell you everything about cancer drives you to keep pushing the boundaries of what lies beyond."

Without a doubt, linking student research projects from the summer term with a course-embedded research project during the semester is an effective way to keep both students and faculty engaged with the problem for a sustained period of time. Students involved in the project are very supportive of their peers while interacting to consolidate their pieces of the project, and are eager to learn about the next

piece of the puzzle. Kylie Peterson, a junior biology major, says that the course has "challenged me and given me the confidence to approach new ideas." "[Cancer Biology] simulates team building that is in the STEM working place and beyond," added Joel Barrett, a senior Biology major applying for M.D./Ph.D. programs. This collaborative environment elevates the intellectual community and keeps everyone thinking creatively about the same problems from new perspectives. George Melchor, a senior biology major, summed it up nicely by stating that "The ability to study what is soon to become the most prevalent disease affecting the world is quite remarkable in it of itself. It is fascinating taking part in cancer research and my level of understanding of this chronic disease has increased exponentially. I have been intrigued this semester learning the history of this disease and the strides the scientific community is making daily

towards understanding cancer."



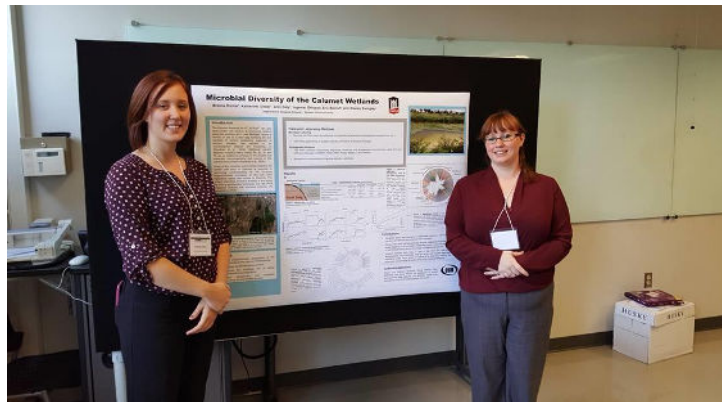
**BIOLOGY DIVISION
STUDENT CONFERENCE
TRAVEL AWARDS
COMPETITION OPEN
THROUGH JANUARY
15, 2016**

Applications are now open for the Spring Student Travel Awards (due 5:00 p.m. EST January 15, 2016) for meetings held between February 16, 2016 and June 30, 2016. For more information about the Spring application process go to:
http://www.cur.org/governance/divisions/biology_student_travel_awards/

CUR Biology Division Presents Student Conference Travel Awards

Biology Division Councilor **Karen Resendes** (Westminster College) reported that four students have received conference travel awards from the CUR Biology Division. Their names, faculty mentors, and institutional affiliations are as follows:

<u>Name</u>	<u>Institution</u>	<u>Mentor</u>	<u>Conference</u>	<u>Title</u>
Rose Massey	Austin College	Lance Barton	American Society for Cell Biology Annual Meeting	Suppression of Cell Growth by Butyrate is PA2gamma Independent
John Kelsh	University of Kansas	Francesca Elizabeth Duncan	2015 Oncofertility Conference	Reproductive Age-Associated Changes in the Extra-follicular Ovarian
Katherine Didier	Northern Illinois University	Wesley Swingley	Midwest Geobiology Symposium	Microenvironment Effects of Natural Sources on Nutrient Levels in Altered and Unaltered Streams
Caela Long	Swarthmore College	Benedict J. Kolber (Duquesne University)	Society for Neuroscience	Analysis of Sex-Based Differences in a Mouse Model of Stress-Induced Analgesia



" As a biologist primarily, this Geobiology conference introduced me to many topics that I had previously little knowledge. Seeing a plethora of teachers and students alike presenting their research to a welcoming audience was inspiring. This conference has given me even more motivation to pursue a masters degree"

Statement from student, **Katherine Didier**, regarding her travel

UPCOMING CUR ACTIVITIES – MARK YOUR CALENDAR!

**CUR DIALOGUES,
FEBRUARY 18-20, 2016,
WASHINGTON, D.C.**

Details:

[http://www.cur.org/events/
cur_dialogues_2016 -
_washington_dc/](http://www.cur.org/events/cur_dialogues_2016_-_washington_dc/)



**30th Anniversary
National Conference
on Undergraduate
Research, University
of North Carolina
Asheville, April 7-9,
2016**

Details at:

[http://www.cur.org/ncu
r_2016/](http://www.cur.org/ncur_2016/)

CUR ANNUAL BUSINESS MEETING

**June 23-25, 2016
University of South
Florida, Tampa, FL**

Details:

[http://www.cur.org/confe
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usiness_meeting/](http://www.cur.org/conferences_and_events/annual_business_meeting/)

**CUR Biennial
Conference June 26-
28, 2015 University of
South Florida, Tampa,
FL**

Details:

[http://www.cur.org/confe
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rence/](http://www.cur.org/conferences_and_events/cur_conference/)

**UNDERGRADUATE
RESEARCH WEEK
APRIL 11, 2016**

Send your event
information to Robin
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NEWSLETTER CONTACTS

The CUR Biology Division Newsletter is published twice annually in most years (Fall/Winter and Spring/Summer). To contribute articles of general interest to the division (announcements and notices are also welcome) contact either of the editors:

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**Happy
Holidays!**