



BIOLOGY NEWS

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Council on Undergraduate Research
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Message from the Biology Division Chair

Karen Resendes (Westminster College)

Welcome to the Winter 2019 edition of the CUR Biology Division Newsletter! After a lively and interactive 2018 Annual Business Meeting, the CUR Biology Division has sprung into action on our ongoing and new initiatives throughout the summer and fall. (Don't we look like a fun bunch in the photo below)! The CUR website update in early fall (check it out if you haven't; it looks great) has caused us to postpone our fall



The CUR Biology Division Councilors

Student Travel Award program; however, our spring award period is expected to run as usual. Our MIRIC subcommittee has its first cohort of mentors and mentees working on CURE development, and the sub-

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About CUR's Biology Division

The Biology Division of the Council on Undergraduate Research provides networking opportunities, activities, and resources to assist biology administrators, faculty members, students, practitioners, and others in advancing undergraduate research.

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Message from the Chair

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committee will be providing workshops at both the ASCB meeting in December and at Experimental Biology via ASBMB in April 2019. Keep up to date with MIRIC and all of our initiatives at cur.org. Finally, read the profiles of our newest councilors in this newsletter and think about nominating yourself this year!•

Meet the Councilors



Natalia Coleman is an associate professor of biology and the founding director of the Scientific Undergraduate Research Institute (SURI), at New Jersey City University (NJCU). Coleman earned her PhD in genetics from Agricultural University in St. Petersburg, Russia. Her research lab studies include looking into the role of NMDA receptors associated with (1) molecular and cellular mechanisms responsible for learning disabilities in Neurofibromatosis type I (NF1) and (2) solid cancers, as well as environmental factors mitigating the adult neurogenesis. She received several grants from pharmaceutical companies to study

novel compounds in cancer. Additionally, she investigates the implementation of technology-enhanced, learner-centered practices in STEM curriculum. Coleman's educational research is predominately funded by the MSEIP grant (\$714,000), US Department of Education. She has supervised more than 40 research students during the past 10 years. To build up the research program within the Biology Department at NJCU, she established the following initiatives: departmental research coordinator position; biology research forum, biology student research orientation, standing research committee. At the university level she created the successful NJCU Summer STEM Undergraduate Students Exchange Program and cross-disciplinary NJCU Student Research Symposium. During the last five years these initiatives have directly impacted more than 800 students. She published 5 book chapters and books, and more than 15 peer-reviewed articles as well as presented her work at more than 50 conferences.•

CUR Dialogues 2019

“Advancing Future Research: Strategies for Long-Term Sustainability”

Arlington, VA • February 14-17, 2019

Postconference Workshops:

- **Beyond the Basics**
- **Introduction to Beginning a Research Program**

Registration deadline: February 1, 2019

<https://bit.ly/2019CURDialogues>

Meet the Councilors



Kim Carlson is a professor and assistant chair of biology at the University of Nebraska at Kearney (UNK) in Kearney, NE. She earned her BS and MS Ed at UNK in biology and a PhD in genetics, cellular, and molecular biology in 1998 from the University of Nebraska–Lincoln School of Biological Sciences. Subsequently, she was a postdoctoral research fellow at the University of Nebraska Medical Center in the Center for Neurovirology and Neurodegenerative Disorders, where she established a Brain Donation Program and a Proteomics Core Facility as a research associate. In 2003, she joined the faculty at UNK as a geneticist.

Carlson is an accomplished educator and research scientist. Her teaching area is in introductory and upper-level courses in genetics, human genetics, bioethics, scientific writing, and graduate education. All coursework involves learning and practicing competency in scientific writing, also in application of material. Hands-on research experiences for undergraduate and

graduate students in basic scientific research, focusing on the scientific method, technique, understanding, and problem-solving. Her research area is in the role of genetic factors in aging and innate immunity using *Drosophila melanogaster* as a model system. Research interests include: molecular characterization of a novel picorna-like virus, Nora virus, in *Drosophila melanogaster*; differential expression of age-related genes in large-caged populations of *Drosophila melanogaster*; and molecular characterization of a putative anti-retroviral gene, OTK18.

Carlson's commitment to training of undergraduates in research has earned her the role of the UNK INBRE campus and grant coordinator since 2004, as well as the Great Plains IDeA-CTR institutional partner. INBRE is a statewide network to train undergraduates in biomedical research to strengthen the pipeline from undergraduate to graduate research. She is an advocate for undergraduates and pursuing new experiences and opportunities for them. Her work with students has earned her UNK's prestigious Pratt-Heins Awards. She has been awarded the Pratt-Heins for research (2011), for service (2012), and for teaching (2017). She is one of only three faculty members to win all three awards. In addition, she has won the most prestigious faculty award at UNK: the Leland Holdt Award for overall excellence in teaching, research, and service (2015). She is only the second faculty member to receive all four awards and is the youngest faculty member to do so.●

Meet the Councilors



Lance Barton is a professor of biology and the director of the Center for Research, Experiential, Artistic, and Transformative Education (CREATE) at Austin College in Sherman, TX. He received his bachelor's degree in biology from Dickinson College and his PhD in molecular genetics, biochemistry, and microbiology from the University of Cincinnati's College of Medicine. As a faculty member, he established a research lab investigating the role of proteasomes in carcinogenesis and he has served on numerous hiring committees. He is also an advocate for enhancing undergraduate research experiences, as his own undergraduate research experiences were instrumental in shaping his career path. Barton has mentored more than 60 undergraduate students in his lab. Through CREATE and as a CUR Councilor, he works to support students, faculty, departments, and institutions to expand access to undergraduate research experiences and increase their quality. As an educator, he helped develop and implement the STAR program at Austin College, which is an integrated curriculum across the sciences that includes leadership development for all students. •

From Claremont, California, to a Fulbright in Warsaw

Gretchen Edwalds-Gilbert (Scripps College)

I am writing from Warsaw, Poland, where I am a Fulbright scholar doing research and teaching at the University of Warsaw's Institute for Genetics and Biotechnology. I arrived at the end of August to get settled and start research prior to the start of the semester in October; however, my journey here began well over a year ago when I prepared my Fulbright application. Prior to applying, I knew that I was eligible to take a sabbatical in the 2018–2019 academic year. I served as the associate dean of faculty at Scripps College in Claremont from 2012 to 2018, and one of my roles was Fulbright Program liaison for both students and faculty. I had the opportunity to learn about the program as well as how to prepare a competitive application. An important part of the Fulbright Program is cultural exchange, and the application needs to show how you engage with others. I enjoy an adventure and thought that after six years in administration, a complete separation from campus would be valuable to recharge and reorient back to being a full time faculty member. I perused the possible awards (<https://www.cies.org/applicants>) and considered where I knew of people in my research area who might be open to hosting a scholar. Note that applications can be for teaching, researching, or a combination of both, and I decided to do a combination; teaching is in English. The awards are for four to nine months, and I decided on nine months, since my sabbatical allowed it and it is difficult to complete a research project in four months. In the spring prior to

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Gretchen Edwalds-Gilbert discusses her Fulbright experience.

applying, 2017, I reached out to Joanna Kufel (University of Warsaw), since I was familiar with her research and thought I could learn a lot. She responded favorably. We then collaborated on the research statement, and she obtained approval from the deans for me to apply to her lab; the strength of the affiliation letter is an important component of the grant and having clear buy-in from the university administration is essential. There are other components of the grant, and as with any grant application, having others review it prior to submission is valuable. Applications are due August 1 each year, and it is not until early December when the US committee sends a notification that it will recommend the host country's committee review of the application. The next step in most cases, including mine, was a video interview with the Fulbright Commission in Poland, and then it let me know that it would recommend me for funding. I received the actual award notification in March 2018, just about a year after starting to apply. I had not relied on receiving the award and had made other plans for my

sabbatical as well. Once I received the award, I planned the big move, and the Fulbright Commission in Poland assisted.

For those who have a sabbatical coming up in the 2020–2021 academic year, start looking at the Fulbright opportunity now and then begin making contacts in the spring.

As for my day-to-day life, I am studying the targeting of proteins to the mitochondria, specifically ones involved in RNA processing that were only recently identified through ribosome profiling experiments to have extended forms that go

to the mitochondria. I use the yeast *Saccharomyces cerevisiae* as a model system, and another part of the Kufel lab uses *Arabidopsis* as a model. I am particularly interested in the regulation of gene expression in response to stress, with a focus on the role of RNA metabolism. Cells encounter stress through their interactions with the environment and either respond successfully, maintaining homeostasis, or do not, leading to cell death. Understanding how cells respond to changes in their environments, specifically to different stress conditions, provides critical insights into regulation of gene expression. Translation is an important regulated step in the gene expression pathway that permits rapid response to environmental changes. Tumor cells, for example, respond to low oxygen levels or genotoxic stress through modulation of translation, and strategies that target these pathways will require a mechanistic understanding of them. As climate changes occur globally, organisms

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must adapt, and translational regulation is an essential part of response to these changes.

I am also team-teaching a molecular biotechnology course where CRISPR/Cas9 is used to create mutations in the yeast *Candida albicans* (a nonpathogenic strain). Teaching is in English for this course, and I am also contributing to a couple of master's-level courses (Molecular Genetics and RNA methods) where the language of instruction is Polish. I will teach in English, but exams and other communication is in Polish, meaning that I will not be participating in grading. In addition to research and teaching, I engage in Fulbright-specific activities, introducing the program to students and faculty, and meeting with people individually to review their applications. The Fulbright Commission also brings all the scholars together from time to time, helping us create a network of colleagues. For me, this is a great way to get back into research and to have new experiences in teaching, living, and travel.●

National Conference on Undergraduate Research 2019 • Kennesaw State University • April 11-13, 2019

- **Abstract Deadline: December 4, 2018**
- **Deadline, Faculty-Administrator Network (FAN) sessions: December 11, 2018**
- **Deadline, Submissions for Art Competition: March 21, 2019**

<https://bit.ly/NCUR2019Gen>

Changes to the Outstanding Research Mentor Award

Each year, the CUR Biology Division chooses recipients of the Outstanding Research Mentor Award, which honors long-term efforts in mentored research with undergraduate students. Awards are made to scientists at the early, middle, and advanced stages of their careers. This year, the nomination process has been broadened. In addition to accepting nominations from colleagues, self-nominations and nominations from undergraduate students are also welcome.

Students who wish to submit a nomination should send an email to the chair of the Mentor Awards Committee (Janet Morrison, morrisja@tcnj.edu) by February 1, 2019. "Mentor Award" should be in the subject line. They should provide their name; title of their mentored research project; and the mentor's name, institution, and email address. The committee will contact the mentor to determine if he or she wishes to accept the nomination. If the nomination is accepted, the student will then provide one of the letters of recommendation.

By late December, materials that describe the student- and self-nomination process will be updated on the Biology Mentor Award webpage (<https://www.cur.org/who/governance/divisions/biology/mentoraward/#Apply>). Stay tuned!●

Building a Bridge for Marginalized High School Students in Indiana

Rona Robinson-Hill (Ball State University)

On June 1, 2017, the inaugural Training Future Scientist (TFS) Ambassador Program at Ball State University (BSU) in Muncie, IN, was launched. The TFS Ambassador Program is a branch of the Young Scientist Program (YSP) at Washington University in St. Louis, MO. The mission of the BSU TFS Ambassador Program is to provide internships in a BSU biology science research laboratory to underserved and marginalized high-school students in grades 10–12 from Delaware County. The students have access to authentic hands-on, minds-on science experiments and work with a principal investigator (PI) on a research project.

The ambassadors spend 30–39 hours a week working in the lab with their PI and two hours a week working with Rona Robinson-Hill, the PI of the TFS–Ambassador Program. The students participate in college readiness training with BSU advisers; advisers from Ivy Tech Community College of Indiana assist the students in creating the personal statements required for their college applications. The culmination of the TFS Ambassadors program is an Ambassador Showcase, which occurs on the last day of the internship. During this showcase each ambassador participates in a 10-minute presentation and highlights their research experience and the benefits of participating in this program. In the future the TFS Ambassador Program intends to increase the number of internships offered from two ambassadors to six to eight ambassadors each summer. Additional goals include pursuing external funding to ensure the program is sustainable at BSU, encouraging

PIs in the Biology Department to provide funding for two additional ambassadors during the summer, and extending the program to the BSU STEM departments and STEM departments at other Indiana universities.



Rona Robinson-Hill, left, with TFS Ambassador Katana Lipscomb. Photo by Chay Reigle.

Meet the Participants

Robinson-Hill is an assistant professor in the Biology Department. A former YSP teacher researcher, she is a board member of the YSP program and has worked with secondary students for more than 20 years. The two candidates selected for the inaugural BSU TFS Program were Katana Lipscomb and Constance Prater.

Lipscomb is a graduate of Muncie Central High School. She joined the research team under the leadership of PI Philip Smaldino and graduate student Antonio Chambers. Her primary responsibility was cellular transfection of the human enzyme G4 Resolvase1 (G4R1) using a tissue culture model. In addition, she read research articles and books in microbiology,

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participation and attendance in lab meetings. Lipscomb reported one of the benefits of the TFS program was that she “learned to take opportunities and to not be afraid to say Yes!”

After completion of this program, Lipscomb plans to attend Ivy Tech as a 21st Century Scholar and pursue the two-year physical therapy assistant program this fall. After completion of the Ivy Tech program, she plans to transfer to Ball State University’s Physical Therapy Program.

Prater, a former student at Yorktown High School, is a rising junior and will be attending Indiana Academy this fall. Prater joined the research team under the leadership of Randall Bernot (PI). Her duties encompassed taking pictures of microorganisms using a digital microscope to identify and document specific specimens and organelles for Bernot to use in future lectures. Her other responsibilities included collecting and dissecting Armadillidiidae, “rollie pollies”; sorting Armadillidiidae based on gender; and reading research journals and books on entomology. Further, Prater managed most of her assignments and worked independently. She reported one benefit of the TFS program was “the free environment ... it’s like being a real employee, not a student.” Prater plans to attend Purdue University or a historically black college or university and double major in Spanish and criminal justice. After



Robinson-Hill, left, with TFS Ambassador Constance Prater. Photo by Chay Reigle.

college, Prater would like to become a homicide detective for the Federal Bureau of Investigation.

On June 30, 2017, Lipscomb and Prater participated in the first BSU TFS Showcase, presenting their research to BSU Biology faculty and TFS Ambassador family and friends. More than 30 people attended the students’ presentations. The ambassadors did an amazing job

explaining their research projects. For example, Lipscomb described many interesting details about the human enzyme G4 Resolvase1 (G4R1), and Prater discussed the parasite carried by Armadillidiidae, “rollie pollies.” The TFS Program plans to train many more students in the BSU TFS Ambassador Program in Muncie and reach out to other underserved and marginalized Indiana communities.●



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The Scientific Undergraduate Research Institute: An Initiative to Enhance STEM Education

Natalia Coleman (New Jersey City University)

The Scientific Undergraduate Research Institute (SURI) is a faculty-driven initiative founded by Natalia Coleman at New Jersey City University (NJCU) in May 2014 with the vision of providing research opportunities for all NJCU STEM students. SURI, officially approved by NJCU Provost Daniel Julius in February 2015, brought together the NJCU STEM departments of biology, chemistry, computer sciences, earth and environmental sciences, mathematics, and physics.

SURI is an umbrella organization that fosters collaboration among STEM faculty members; promotes research opportunities for undergraduates; and establishes a unified vision and culture of undergraduate research to attract prospective students, potential donors, and research grants. Its mission is to provide research opportunities to all STEM students; to educate a new generation of lifelong learners, critical thinkers and innovators; and to enhance a collegial, respectful, productive and fun-working environment for the faculty.

Administration of SURI consists of a founding director who reports directly to NJCU's provost, associate director, and an Executive Committee with representatives from different STEM departments. SURI has six subgroups: research, curriculum, fundraising, publicity, outreach to industry and graduate schools, and outreach to community colleges and high school STEM teachers. In addition to an intense pedagogical focus, SURI faculty members identify common research interests so that

cross-disciplinary research projects can be developed; their long-term plan is for the research projects to feed back into an enriched undergraduate STEM curriculum (see Coleman et al. 2016).

In September 2016, SURI received a MSEIP grant, valued at \$714,216 from the U.S. Department of Education for the proposal "The Scientific Undergraduate Research Institute: A Model Program for Enhancement of STEM Education." Coleman is a project director. The project created a collaborative team of 11 faculty members from two NJCU colleges and seven departments: co-directors Reed Carroll, Muriel Rand, Allan DeFina, and Daniel Ward; and faculty members Hanae Haouari, Ethan Prosen, Hun Bok Jung, Debananda Chakraborty, Yufeng Wei, and Allison Fitzgerald. The program includes faculty development; student career enrichment; active learning, and a summer research exchange initiative. During the two years of the implementation, the program impacted more than 1,000 students.

Reference

Coleman, Natalia, Donna M. Farina, and Leonid Rabinovich, L. 2016. Common Denominators to Learner-Centered Success: Undergraduate STEM, Graduate Teacher Education, and an Educational Technology Doctoral Program. *Handbook of Research on Learner-Centered Pedagogy in Teacher Education and Professional Development*, 23-44. Hershey, PA: IGI Global.
<http://www.igi-global.com/chapter/common-denominators-to-learner-centered-success/163485>

Student Travel Award Recipients (Spring 2018)

More than 20 applications were received for the CUR Biology Division Spring Student Travel Awards, with four students selected to receive an award of \$250.

Yanjun (Holly) Huang

Mentor: Evangeline W. Cornwell
Gordon College

“A Phenotypically Distinct Subset of Eosinophils Is Recovered with Intestinal Intraepithelial Leukocytes”

The American Academy of Allergy, Asthma, and Immunology

(did not attend due to weather complications)

Sarah Harris

Mentor: Patrick Lackey
Westminster College

“Biophysical Characterization of Interactions between a Uridylated histone mRNA Degradation Intermediate and SLBP”
American Society for Biochemistry and Molecular Biology

Austin Butala

Mentor: Sherrell Byrd
Fort Lewis College

“Aqueous Extract of Lavender Demonstrates Immunomodulatory Effects through Activation of NFκB”

American Society for Biochemistry and Molecular Biology

Sophia Kelly

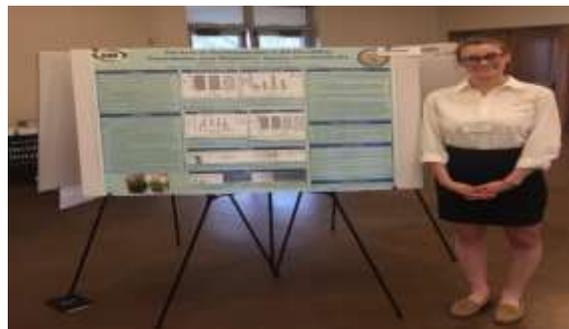
Mentor: Lonnie Guralnick
Roger Williams University

“Role of Photorespiration in the Facultative CAM Species”

Biology of CAM Plants International Conference

Kelly said: “Thank you again for the support to attend the Biology of CAM Conference; it was an amazing opportunity. It was an amazing experience to have the opportunity to present

my research and meet other scientists with similar research interests.” Kelly was awarded honorable mention for her poster at the meeting and had the opportunity to meet with representatives from several graduate programs.



Sophia Kelly with her poster at the Biology of CAM Plants International Meeting in April 2018

Upcoming Deadlines

CUR Events

See the new CUR website (<https://www.cur.org/>) and the CUR events page <https://www.cur.org/what/events/>

Conferences

ASM Conference for Undergraduate Educators. Tysons, VA, August 1-4, 2019. Session proposals close January 10, 2019. Poster abstracts open January 3, 2019. Registration opens March 15, 2019.

<https://www.asm.org/index.php/asmcuc>

Second World Congress on Undergraduate Research: Carl von Ossietzky University Oldenburg, Germany, May 23-25, 2019.

<https://www.uni-oldenburg.de/en/forschen-at-studium/world-congress-on-undergraduate-research/>

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Gordon Research Conference:
Undergraduate Biology Education
Research, June 23-28, 2019, Bates College.
Registration deadline: May 25, 2019.
<https://www.grc.org/undergraduate-biology-education-research-conference/2019/>

Grants and Awards

NSF Research Coordination Networks in
Undergraduate Biology Education (RCN-
UBE) program (NSF 18-510)
https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505495

NSF Improving Undergraduate STEM
Education: Education and Human
Resources (IUSE: EHR), call open, variable
deadlines
[https://nsf.gov/funding/pgm_summ.jsp?pi
ms_id=505082&org=NSF&sel org=NSF&frm=fund](https://nsf.gov/funding/pgm_summ.jsp?pi ms_id=505082&org=NSF&sel org=NSF&frm=fund)

NIH AREA (R15) Academic Research
Enhancement Award. Deadlines: February
25 and June 25. <https://area.nih.gov/>

Sigma Xi Grants in Aid of Research (GIAR).
Deadline: March 15, 2019 (must be a Sigma
Xi member). www.sigmaxi.org

Fulbright Program: application opens
February 2019; application deadline:
August 1, 2019. www.cies.org.

NEW from CUR! *Excellence in Mentoring Undergraduate Research*



This cross-disciplinary volume incorporates diverse perspectives on mentoring undergraduate research, including work from scholars at many different types of academic institutions in Australia, Canada, the United Kingdom, and the United States. It strives to extend the conversation on mentoring undergraduate research to enable scholars in all disciplines and a variety of institutional contexts to critically examine mentoring practices and the role of mentored undergraduate research in higher education.

To order, visit the [CUR Bookstore](#).