Creating a Culture of REU Excellence at Salisbury University

By Dr. Clifton Griffin, Dean of Graduate Studies & Research;
Teri Herberger, Director of Sponsored Programs; & Beth Walsh, Grant Specialist


Dr. Enyue (Annie) Lu


Dr. Randall Groth

The National Science Foundation's (NSF) prestigious Research Experiences for Undergraduates (REU) program supports undergraduate students in meaningful ways in ongoing research programs or in research projects specifically designed for the REU program. REU sites are based on independent proposals to initiate and conduct projects that engage students in research. REU sites may be focused on a single discipline or academic department, or they may offer interdisciplinary or multi-department research opportunities with a coherent intellectual theme.

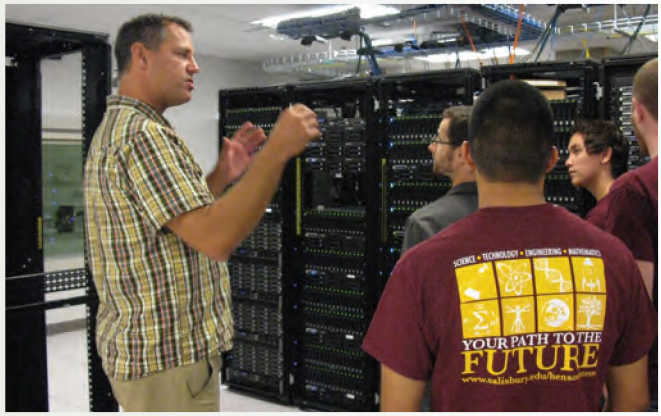
Continuing its campuswide dedication to undergraduate research, Salisbury University has received funding for three REU sites in the past three years.

"Becoming an REU site is highly competitive; most are found at large research institutions," said Dr. Clifton Griffin, SU's dean of graduate studies and research. "SU's designation shows that we are recognized for the excellent research opportunities that we provide for undergraduates."

In the Henson School of Science and Technology, Dr. Enyue (Annie) Lu, an associate professor in the Mathematics and Computer Science Department, received the first of these REU awards (valued at over $300,000) in 2012 for her project titled "EXERCISE - Explore Emerging Computing in Science and Engineering." Each summer, for the past three years, eight undergraduate students from throughout the country spent 10 weeks working together to solve complex problems in the emerging parallel computing field. With substantial cooperation from faculty mentors from the University of Maryland Eastern Shore, a historically black college and university (HBCU), and Johns Hopkins University, the summer research program allowed students to carry out projects that combined theory, algorithms, implementation, analysis, simulations and experiments.

SU's second REU site completed its first successful year over the summer of 2014. This three-year program was proposed and submitted to the NSF by Dr. Randall Groth, an associate professor who specializes in mathematics in the Seidel School of Education and Professional Studies' Education Specialties Department, along with Dr. Jennifer Bergner, a professor in the Henson School's Mathematics and Computer Science Department. The grant they received was valued at more than $260,000.

This second REU program, "PATHWAYS - Preparing Aspiring Teachers to Hypothesize Ways to Assist Young Students," is designed to engage undergraduate pre-service teachers in formal research on K-12 students' mathematical learning. The overarching goals are: to help undergraduates develop formative assessment techniques vital to becoming accomplished teachers, and to motivate them to pursue graduate study in mathematics education. Working in pairs, under the guidance of SU faculty mentors, eight undergraduate students designed and tested weekly mathematics instructional session for small groups of students from K-12 grade levels. They analyzed instructional effectiveness and made modifications weekly, and a cumulative report described the K-12 learning trajectories, ultimately helping to test and refine current mathematics education research. Not only does PATHWAYS assist eight undergraduates each year, it also has a direct impact on K-12



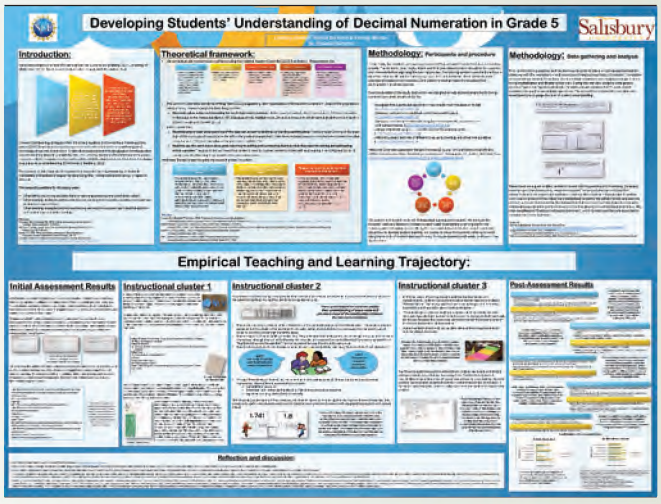
education, with 32 students receiving summer mathematics instruction annually at SU and over 96 K-12 students directly impacted over the life of the project. PATHWAYS breaks new ground by providing a model for engaging undergraduates in mathematics education research.

Lu's REU EXERCISE project was extremely successful with full participation each summer. The program evaluations and student feedback indicated that the EXERCISE REU site better prepared the participants for their future graduate studies and professional careers.

With these achievements in mind, Lu submitted a second proposal to NSF to continue the site and EXERCISE project at SU for an additional three years. She recently received notification that her project was funded; the NSF awarded a grant of nearly $360,000 for the site to carry on in the summers of 2015, 2016 and 2017.

Based on Lu's success and increased student interest in the site, the number of attendees has been increased to 10 undergraduate students each year. Multiple projects will continue to offer the participants valuable research experiences related to paradigms in parallel computing that have become necessary with the exponential growth and complexity of information and data in today's fast-paced, technology-rich, global world.

In addition to working with mentors on the research, the students will be involved in field trips and social activities related to their field, and they also will receive assistance with their graduate school applications. SU will continue the successful collaboration with UMES, and faculty from the University of Maryland College Park will provide their expertise. The renewal site hopes to attract more students – including those from local HBCUs, primarily undergraduate institutions (PUIs) and community colleges on Maryland's Eastern Shore – into computational majors and the general science, technology, engineering and mathematics (STEM) fields.



The NSF REU is specifically designed to support undergraduate research, but these three REU projects are not the only NSF-funded projects that enhance SU's culture of fostering undergraduate research. Dr. Tom Jones, past SU provost, and Dr. Karen Olmstead, dean of the Henson School, were successful in obtaining NSF funding for their "Bridges for SUCCESS" program. Their plan was to create Bridges for SUCCESS (Salisbury University's Connections to Careers for Every STEM Student) by mentoring students from high schools and community colleges through baccalaureate degrees in selected STEM majors and then on to careers in STEM fields. To create these bridges, Jones and Olmstead worked to develop and support STEM awareness among high school students through science camps and science nights for students and families; facilitate the seamless transition of community college students to SU's STEM majors through academic and transition support, including summer research fellowships; support entering students with STEM Living Learning Communities and early research experiences; and provide opportunities for upper-division STEM majors to participate in applied research projects.

The goal of all of these efforts is to create a strong network of support for students bridging them from pre-college, through college, to careers in STEM.

The contributions made by the outstanding SU faculty toward increasing undergraduate research for over 400 students are another example of the culture and conviction of the University's dedication to undergraduate research over the past 10 years. v