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Five Grants Helped Fund Research for Biology and Chemistry

Winthrop University

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Five Grants Helped Fund Research for Biology and Chemistry

Quick Facts

- The latest round of federal grants awarded this spring – totaling more than \$100,000 - comes from a pool of money designed to build a scientific workforce to support novel research efforts and to increase education opportunities for underrepresented minority students.
- Faculty members continue seeking out such grants because it gives Winthrop students the chance to participate in research at an early point in their education.



Pat Owens

ROCK HILL, S.C. - Winthrop University science faculty members worked full time in their laboratories this summer to research iron uptake in pneumonia, cardiac regeneration and the breakdown of plant material to use for energy, thanks to recently awarded federal grants from the [National Science Foundation](#).

The four professors are assisted by undergraduate students, and in one case, also a local high school teacher and student.



Nicholas Grosseohme

South Carolina has emerged as a prime candidate for federal health research dollars because it ranks among the nation's highest in stroke deaths, cardiovascular disease deaths and cancer rates. Since 2005, Winthrop has been part of a **consortium of 10 S.C. institutions** – three research and seven teaching institutions - given millions of dollars to improve health research efforts.

Winthrop is the second largest predominantly undergraduate institution of the 10 institutions. It has parlayed its involvement to establish a nationally distinctive undergraduate biomedical research program with new equipment and other improvements, according to [Pat Owens](#), chair of the [Department of Chemistry, Physics and Geology](#).



Heather Evans-Anderson

The latest round of federal grants awarded this spring – **totaling more than \$100,000** - comes from a pool of money designed to build a scientific workforce to support novel research efforts and to increase education opportunities for underrepresented minority students. This is the first time Winthrop faculty members have tapped into this pot of money from the [South Carolina EPSCoR/IDeA office](#).

Faculty members continue seeking out such grants because it gives Winthrop students the chance to participate in research at an early point in their education. These opportunities are priceless, said [Nick Grosseohme](#), a chemistry associate professor and a grant recipient. "Receiving this grant gives me and two undergraduate colleagues a wonderful opportunity to begin exploring a new direction of research in my laboratory."

[Assistant Professor of Biology Heather Evans-Anderson](#) added that she reached out to local high school teachers and students to involve them in these valuable research experiences. The grants also have helped with the recruitment of top students from the area to Winthrop. "I am also very proud of my collaboration with the [Medical University of South Carolina](#) and am grateful for the expanded opportunities that this brings to my students," Evans-Anderson said.

Here is an outline of the five projects:

1. Role of Foxo1 in Endothelial Cell and Cardiac Myocyte Signaling

Faculty Member: **Heather Evans-Anderson**, Biology, College of Arts and Sciences, \$23,500

Evans-Anderson is working this summer with undergraduates **Katrina Harmon** and **Hannah Hadaway** on her ongoing cardiac regeneration research. Also assisting are **Kim Rathod '11**, a Nation's Ford High School biology teacher in Fort Mill, S.C., and Winthrop alumna, and **Rachel Dawson**, a rising junior honors student at Nation's Ford.

The goal of Evans-Anderson's work is to identify cell signaling factors involved in endothelial-myocyte interactions which will provide insights into the regulatory mechanisms of heart development.

2. Defining Pathways That Direct Smooth Muscle Cell Differentiation From Adipose-Derived Stem Cells

Faculty Member: **Heather Evans-Anderson**, Biology, College of Arts and Sciences, \$49,000

Evans-Anderson is working in conjunction with researchers **Rick Visconti** and **Chris Drake** of the Medical University of South Carolina. She and her students, undergraduate **Willie Bush** and graduate student **Kate McGuinness**, will examine the role of signaling pathways in directed differentiation of adipose-derived stem cells to help direct therapeutic efforts to repair or replace injured vascular tissues. Their project received \$100,000 in funding, with \$49,000 of that for Winthrop.

3. Exploring a Potential Link Between Phosphorylation and Iron Homeostasis in S.Pneumonia

Principal Investigator: **Nick Grosseohme**, Chemistry/Physics/Geology, College of Arts and Sciences, \$16,060

The project is focusing on exploring how iron uptake is controlled by Streptococcus pneumonia, a bacteria that can cause a number of different diseases including pneumonia and meningitis. Grosseohme and students **Ashley Williams** and **Jesse McLaughlin** will investigate the sensory network because it appears to be a novel mechanism in bacteria and may eventually lead to antibiotics that can selectively target this organism.

4. Crystallographic Analysis of Novel Members of Glycosyl Hydrolase Family 30 from Bacteroides SP

Principal Investigator: **Jason Hurlbert**, Chemistry/Physics/Geology, College of Arts and Sciences, \$16,000

Hurlbert said breaking down plant material to convert to fuel ethanol is receiving renewed attention because of the high cost of petroleum and America's desire for energy independence. He has received this particular grant to evaluate two proteins for their ability to degrade plant material by determining their three-dimensional structure and studying their function. Working in the lab with him are undergraduates **Alec Reed**, **Brianna Milks** and **Mariam Salib**. Hurlbert said their structural and biochemical data will be used to compare the new proteins to other well-characterized enzymes to help fill in the details and will be shared with groups at the **University of Florida** and **U.S. Forest Service**.

5. Gradient Flow Analysis

Principal Investigator: **Clifton Calloway**, Chemistry/Physics/Geology, College of Arts and Sciences, \$7,500

This grant was awarded from the South Carolina EPSCoR/IDeA's Scientific Advocate Network program which is designed to increase participation in projects and programs by members of underrepresented minority groups and women. Student **Velma Tahsoh** is assisting Calloway in the development of a rapid, dynamic gradient flow system for quantitative measurements of liquid or solution samples. The method will simultaneously determine concentration, as well as correct for background interferences and environmental changes in about one minute of analysis time. Tahsoh will assist in the design and construction of the analytical system and application of the method to commercial samples and overall characterization of the system.

For more information on the grants, please contact **Judy Longshaw**, news and media services manager, at 803/323-2404 or e-mail her at longshawj@winthrop.edu.

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