

# CURQ SPECIAL FEATURE VIGNETTES:

## *How the Flawed Federal Budgeting Process Damages the National Undergraduate Research Agenda*

### **Sequestration Leads to Mid-Research Changes at University of South Alabama**

The University of South Alabama receives federal research funding from the National Institutes of Health (NIH), the National Science Foundation (NSF), the Health Resources and Services Administration (HRSA), the National Oceanic and Atmospheric Administration (NOAA), and other federal grant-making agencies. Given the substantial amounts of federal research dollars received by our institution, the funding cuts resulting from sequestration have affected research groups on our campus greatly, and in many different ways. Sequestration is damaging because it directly impacts current research projects and forces modification of projects in the middle of the work.

Cutting the funds that have been promised has a huge impact in many projects. For example, if a study involves patients, cutting funding may yield data that are not statistically sound. In other cases, it prevents investigators from corroborating results through additional research methods or using different equipment. Furthermore, undergraduate research is particularly impacted by sequestration because many labs that normally sponsor undergraduates in research will cut their undergraduate projects if they are considered ancillary to the main line of research in the lab.

#### **Julio F. Turrens**

*Professor*

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*Pat Capps Covey College of Allied Health Professions  
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### **Layoffs, Student Shifts at University of Washington**

At research universities, the cut in research funding at federal agencies resulting from sequestration has meant the loss of a significant amount of current and future funding, necessitating spending reductions that include layoffs in research-related jobs. This weakening of the research infrastructure not only has immediate consequences, but also other indirect, longer-term ones. The loss of these jobs is a terrible blow for researchers who have dedicated their careers to advancing knowledge and discovering solutions to some of society's most intractable problems, and for all of us who benefit from that work. Even more distressing, however, is the effect that this environment—in which scientific research is so competitive that many of our most successful and productive researchers are not able to gain support for their work—is having on our students' plans for careers in science.

In some of my most recent conversations with undergraduate researchers at the University of Washington, students have expressed concern about their prospects for a satisfying career in science, and many of them are switching out of their science majors into fields they (and their mentors) perceive as more stable. At a time when our nation's educational enterprise is focused on developing stronger preparation for and retention of students of all backgrounds in STEM (science, technology, engineering, and mathematics) fields, our national decisions on economic priorities are telling a very different story to our students. Losing future discoverers and leaders at this early stage in their career pathways is a great loss to the country, indeed.

#### **Janice DeCosmo**

*Director of the Undergraduate Research Program  
University of Washington*

## Summer Research Slots Hit at Central Washington University

Central Washington University (CWU) is a four-year, public university located in rural Washington state. The university largely serves state residents and graduates about 2,500 students per year. More than 75 percent of the institution's students have either a subsidized or unsubsidized federal loan; state funding now accounts for just 16 percent of the university's total budget.

Sequestration negatively impacts the university community. For example, CWU currently has more than \$9 million in funding from the National Science Foundation, National Institutes of Health, and the Washington Space Grant Consortium. But sequestration will reduce the number of new awards these agencies can provide in upcoming fiscal years. Cutbacks may even lead to the possible elimination of research solicitations or grant competitions for some programs. A reduction of awards will result in less funding being available to support basic research and less for training the next generation of scientists on our campus. This next generation is being further impacted because many CWU students were unsuccessful in securing summer research positions in 2013 due to a lack of funding. In fact, the research of one of the few students accepted into a summer research program was delayed because of the funding uncertainty caused by sequestration.

It is not just sequestration of federal research dollars that impacts how many undergraduates participate in research opportunities. Sequestration is also impacting a number of discretionary programs supported by the Department

of Education that provide the foundation for low-income students to participate in undergraduate research. These programs include the TRIO programs and the College Assistance Migrant Program (CAMP). Federal student-aid programs such as Federal Work Study and the Supplemental Educational Opportunity Grants are also adversely affected by sequestration. These cuts impact the basic financial support students can obtain, which can be a deciding factor in their participation in undergraduate research. Without sufficient aid, low-income students often need to find part-time employment, which eliminates any time for extracurricular or elective curricular activities such as undergraduate research.

Finally, our campus, along with the broader scientific community, needs reliable, sustained funding, but sequestration creates a lack of certainty or predictability. In the student-funding world, it is often said that *predictability* is nearly as important as affordability. One cannot plan or know what to save or borrow in the uncertain world created by federal budget stalemates. This also adversely impacts research since someone may be less likely to launch research initiatives if continued support is uncertain. Sequestration thus has had and will have an adverse impact on CWU in both quantifiable and intangible ways.

### **Michael Jackson**

*Professor, Department of Physics  
Central Washington University*

### **Linda Schactler**

*Executive Director of Public Affairs  
Central Washington University*

## Impacts Feared at University of New England

To maintain a well-trained workforce that is globally competitive in a STEM-driven society, experiential, research-intensive education is a must. Although the University of New England (UNE) has not yet seen the full impact of sequestration, we are bracing for it. One of the challenges for long-term projects is the inability to plan beyond the current year, since many of the federal agencies that fund our work have announced the likelihood of funding cuts. As an example, we have been informed that the funding for one of our service grants will be cut by 16 percent next year, resulting in fewer students being trained in health and science fields at UNE. As sequestration cuts affect more projects, student involvement in research will decrease. Thus, reducing the funding for research impacts not only established researchers, but also current and future students who make up our next generation of leaders.

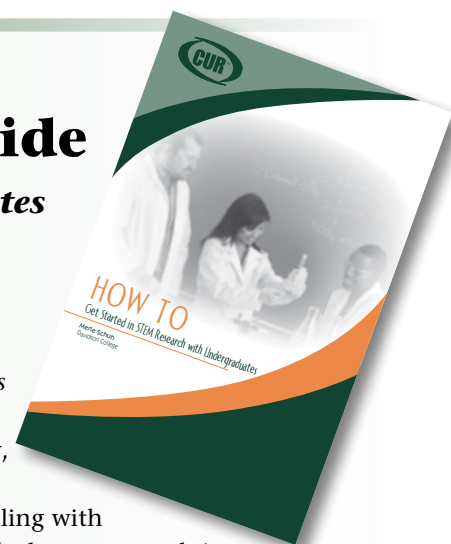
The College of Arts and Sciences (CAS) is a small, liberal arts college within UNE. CAS boasts a 13:1 faculty student ratio, and our undergraduate research students have presented and published in a wide variety of disciplines, including medical biology, marine science, chemistry, physics, history, psychology, English, political science and more. Although UNE and private foundations provide some of the financial support for these activities, much of the basic research and presentation/publication costs are subsidized by programs in federal agencies, including the National Science Foundation, the National Institutes of Health and the National Oceanic and Atmospheric Administration. The UNE Summer Undergraduate Research Experience (SURE) program provides summer stipends to 25 to 30 undergraduates per year, but requires additional support for supplies from their faculty mentors' own research awards. Furthermore, The National Aeronautics and Space Administration Maine Space Grant, as well as faculty-held grants, enable at least 10 or more

## CUR RELEASES NEW *HOW TO* Guide *How to Get Started in STEM Research with Undergraduates*

Edited by Merle Schuh

Faculty members face unique challenges and issues in doing successful research with undergraduates in STEM fields. *How to Get Started in STEM Research with Undergraduates* provides a general discussion of these special issues and discusses ways to deal with them. Examples of such issues include: setting up and managing a research laboratory, designing student research projects, working with administrators, seeking research grants, writing successful grant proposals, integrating research into the classroom, dealing with information management, and making optimal use of the primary literature. Although the monograph is directed toward helping faculty who are in their early years of teaching, it should also be valuable in showing administrators the needs they must address in providing an environment in which new faculty researchers can be successful and what expectations they can have of faculty. The appendix lists some research agencies that fund undergraduate research.

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additional students to engage in projects over the course of the summer and academic year.

UNE students often obtain their first professional presentation experience through the NSF-funded Northeast Undergraduate Research and Development Symposium (NURDS)—a regional meeting at UNE providing undergraduates from the entire Northeastern U.S. and Maritime Canada with a forum in which to present, network, and share their research in a professional setting. This conference allows the students to build communication skills and often prepares them for national and international scientific meetings. Finally, equipment grants such as those awarded through NSF and NIH are absolutely essential for allowing our students to gain experience with state-of-the-art instrumentation.

Generally, the sequester has imposed funding cuts to all of the federally funded programs that support undergraduate research opportunities on UNE's campus. Casey Toombs, a recent graduate of UNE, is an example of the kind of student researcher who may be directly impacted in the future. While Toombs studied medical biology as an undergraduate, she knew she eventually wanted to pursue an advanced degree in medicine. Initially, she did not know anything about basic research or how a research experience would enhance her ability to gain admittance to medical school or increase her knowledge about science as it related to medicine. As a sophomore, Toombs started working in the laboratory of Markus Frederich, where she contributed to an NSF-supported project that used novel approaches to determine cellular stress markers in marine organisms. She received summer stipend support through the campus SURE program in 2010 and an undergraduate summer research fellowship from the American Physiological Society (APS) after her junior year (2011). Only 24 of the APS fellowships are awarded nationwide per year, and it was clear that in addition to her outstanding academic credentials, her previous research experience funded through the SURE program and NSF allowed her application to be very competitive. Further, supplies and equipment for Toombs'

research were provided, in part, from NSF grants to Dr. Frederich. The NSF-sponsored NURDS program provided Toombs with the first opportunity to present her research at a professional meeting, an experience that led to other presentations across the country. She has since submitted this work for publication as a first author. Toombs graduated from UNE in 2012 and her extensive and successful research experience contributed to her admittance to medical school in Virginia. Her ability to apply the scientific principles she learned in all of her courses to a real-life research question increased her understanding of how medical treatments are developed and applied to human disease. Without further funding, students like Toombs will not have the same type of experiences.

**Deena Small**

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