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## Small Grants Make a Big Difference

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## Small Grants Make a Big Difference By Susan Walsh

*Editor's note: Sigma Xi offers Science, Math, and Engineering Education (SMEE) Grants worth up to \$2,000 each to the Society's chapters to fund innovative education programs. Susan Walsh, president of the Rollins College Chapter in Winter Park, Florida, shares the outcomes of their grant below. Chapter leaders may find application information at [www.sigmaxi.org](http://www.sigmaxi.org) by clicking on "Chapters" and then "Officer Resource Center." The application deadline is March 1.*

With Sigma Xi's Science, Math, and Engineering Education (SMEE) Grant, I was able to refine an undergraduate classroom experience that gives students hands-on opportunities to learn multiple techniques to support the same experimental conclusion. This laboratory exercise introduces 1) culturing human tissue culture cells, 2) confocal microscopy, 3) subcellular fractionation of cells into cytoplasmic and nuclear components, 4) SDS-PAGE, a technique to separate proteins, and 5) western blotting, a technique used to detect single proteins in a sample. Furthermore, this laboratory exercise permits hands-on analysis of cellular nutrient homeostasis, signaling, and subcellular localization. Finally, it can be enriched to include additional variables, thereby generating independent research projects for students to manipulate and understand these signaling pathways in greater depth. I used SMEE grant money to purchase expensive antibodies and drugs to perform control experiments. The grant also financed a small stipend for a dedicated student, Annamarie Bryant, class of 2016, in the lab.



Bryant and Matt Volk, class of 2018, presented this project at the 2016 American Society for Cell Biology Annual Meeting (Bryant et al., 2016). Both students were nominated for Sigma Xi membership.

"The results from this project led to a summer research opportunity that was one of the highlights of my academic career," Bryant said. "I have honed not only my laboratory skills, but also my written and oral communication abilities, and I have had the honor to work alongside the faculty at Rollins College."

Funds from the SMEE grant also provided appropriate experimental controls for students this semester, which will improve their learning experience. They will participate in a modified pre- and post-test to assess their technical understanding and application of the techniques. After seeing Bryant's good experience, students are

motivated to design their own independent explorations in cell biology. We also are writing about the laboratory procedure for publication in an education journal.

I encourage others to apply for the SMEE Grant; it has enabled meaningful research opportunities for my students.

Bryant, A. T., M. Volk, P. S. Sickler, S. M. Ferguson, and S. Walsh. 2016. Three-Week Cell Biology Laboratory Exercise: Signaling Influences Subcellular Localization of TFEB-GFP. In *Abstracts: Poster Presentations*, supplement, *Molecular Biology of the Cell* 27:S7-S8. doi:10.1091/mbc.E16-10-0736,

Photo caption: From left, Susan Walsh, Paxton Sickler, and Matt Volk work in the lab at Rollins College. (Image courtesy of Scott Cook.)