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Chemical Engineering Student Engaged in Research at Oak Ridge

by Jerry Renshaw

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Tennessee Tech University chemical engineering student Sarah Russell is working to make solar cells more efficient through research at Oak Ridge National Laboratory.

Russell, a senior from Tullahoma, works in ORNL's Spallation Neutron Source, with funding from the National Science Foundation's Tennessee Solar Conversion using Outreach, Research and Education program.

"I was able to do some research at the ORNL SNS in December 2013, on a related project," said Russell. "Needless to say, I'm pretty excited about having access to it again."

Associate chemical engineering professor Holly Stretz is involved in Russell's research, serving as principal investigator. Her four-year collaboration with Mark Dadmun and Mike Kilbey at University of Tennessee, Knoxville, has introduced dozens of TTU undergraduate and graduate engineering students to nanotechnology and nanomanufacturing in solar cell manufacturing.

The TTU team's work has resulted in numerous papers and state and national conference presentations. Stretz said she believes that training the next generation of engineers in renewable energy technologies and innovation is an essential component of preparing for the challenges these millennials will face across their careers.

The Spallation Neutron Source apparatus accelerates particles from an ion source, accumulates them and collides them with a container of liquid mercury. The discharged are collected and used in a variety of experiments related to materials, pharmaceuticals and agriculture.

The 80-acre site at Oak Ridge is host to hundreds of researchers from industry, universities and government entities, which results in a considerable waiting list to use its resources.

Organic photovoltaic cells have the advantage of being lighter, smaller and more flexible than the more-common inorganic design. The manufacturing process can be less expensive and cost-effective for more applications.

However, organic cells are less efficient. The aim of the ongoing research is to improve efficiency and make the manufacturing process more environmentally friendly. More efficient cells could be useful for cars, backpacks, phones and other small devices. Already, researchers have seen an increase in the efficiency of organic cell panels. Scalable, industrially viable manufacturing methods of efficient cells could result in a cost-effective generation of solar power technology.



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