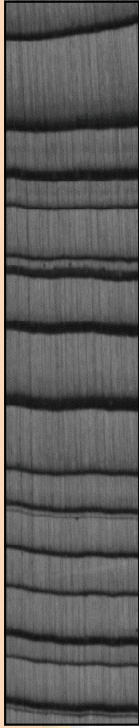


## Tree Rings and Climate Variability

The Department of Environmental Science welcomes Dr. Nicole Davi to William Paterson University. She comes to us from Lamont-Doherty Earth Observatory of Columbia University where she was a Post-doctoral Research Fellow focusing on developing a 500 year drought history in Asia.



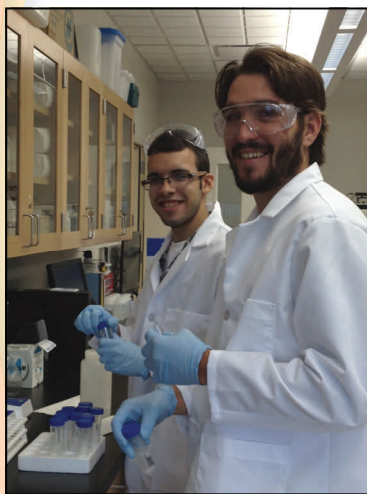
Davi uses tree rings to evaluate drought on long-term scales and she has spent many summers traveling to remote regions around the world in search of undisturbed, climate-sensitive, old-aged trees. The field of tree-ring science, or dendrochronology, uses the annual growth variation of long-lived trees to better understand what the climate was like over hundreds, even thousands of years. The tree-ring based climate records can then be used to reveal the full range of past climate variability, which may be much larger than what is captured by the limited instrumental records. Developing long-term climate records can further understanding of present and future climate change and help inform international risk management programs. Tree-ring reconstructions can be used to answer questions such as: How often do



climate related disasters occur? How severe are they and what are the spatial patterns? Are these type of events related to a warming environment?

Davi works collaboratively with researchers in many disciplines, including, atmospheric science, economics, engineering, climate modeling, remote sensing/GIS and education, and she believes that the major issues facing our society today are best tackled from a multi-disciplinary approach and take into consideration both human and natural systems and their interactions. Davi is a Project Investigator on several National Science Foundation grants to develop climate reconstruction in the North Pacific region and also to develop interactive curriculum for undergraduate classes.

### FUTURE SCIENCE EDUCATOR, BY CHRIS BUSH



During the spring and summer of 2013 semester I had the opportunity to assist Dr. Callanan with her research on fire soil relationships. Beginning in 2009, Dr. Callanan and her students sampled soil from a prescribed burn at Double-N-Pheasant Farm in Warren County, New Jersey. They hoped to gain a better understanding of how forest fire affects the soil beneath it. Initial analysis showed that the clay mineral chlorite was showing irregular weathering rates in post fire conditions.

More recently, Dr. Callanan and her students conducted a laboratory experiment in which bulk *chlorite* was weathered using rainwater, soil, and ash. The purpose of this was to recreate the weathering conditions present at the farm from 2009. Working as a ROCHE mentor during the summer 2 session, one of my tasks was to prepare these samples for further analysis with the help of a student from International High School in Paterson. The ROCHE program chooses high school students from Paterson, who show a strong

interest in science and mathematics and gives them a rare opportunity to work under a mentor in one of many great laboratories at William Paterson. My assistant Ray and I spent our time preparing chlorite and soil samples for x-ray diffraction analysis as well as exchangeable ion solutions for analysis on the atomic absorption spectrophotometer.

I have always learned more through hands on activity, and I believe strongly in the idea that the best way to learn something is to teach it. The ROCHE program gave me the opportunity to do just that. Having the privilege to be a mentor in a laboratory using high tech analysis equipment has been an invaluable experience. As a future educator I hope to pull from my experience as an undergraduate as well as my interactions with the environment and teach students to respect and admire the world around them. Being a student in the Environmental Science Department at William Paterson has brought me closer to achieving that goal.