

Three Engineering Students Gain Research Experience with Elizabethtown College's SCARP Program

For many college students, the summer is an opportunity to take a break from classes and gain practical experience at a job or internship. Three engineering students, Josiah Buxton, Anthony Fraccica, and Dan Gresh took on a different role by participating in Elizabethtown's inaugural Summer Creative Arts and Research Program (SCARP). SCARP was designed to provide funding for undergraduate summer research at Elizabethtown College with students working under the direction of professors for spans of three to ten weeks. Engineering faculty had conducted research with students in previous summers, but this was the first year for summer research to take place under the umbrella of SCARP. Within the department, Josiah, Anthony, and Dan got a taste of cross-disciplinary research by exploring topics outside their area of concentration.



Computer engineering major, Josiah Buxton spent several weeks working on a biomechanical engineering project under the direction of Dr. Kurt DeGoede. Josiah's work primarily involved developing code for the electronic motor assessment tool (EMAT), patent pending. This tool is used to assist in the diagnosis and treatment of stroke, Parkinson's and others with motor control disability. EMAT provides a real-time data stream through which guide the patient through challenging therapy sessions. Therapists also use the data to make assessments of patients' motor skills. While EMAT has been previously successful in providing real-time biofeedback, the data are noisy, making it hard to use the biofeedback consistently. Over the summer, Josiah took first steps in improving the stability of the real-time data stream. His work played an important role in the ongoing efforts to optimize the software for clinical use. During the academic year four 5th year Occupational Therapy students are utilizing the EMAT system for their master's thesis work.

Anthony and Dan, both engineering majors with mechanical concentrations, worked with Dr. Brenda Read-Daily on the Development of an Engineered Drainage Tile for Nitrogen Management. This research seeks to develop an alternative drainage tile that can prevent the damage caused by excess nitrogen in the aquatic environment. Dan and Anthony used their design and fabrication skills garnered from the Department of Engineering and Physics's strong project-based curriculum by designing numerous drainage tile prototypes. Dan and Anthony researched materials and developed unique ways to simulate a tile drainage system. Once their prototypes were constructed, they tested the flow through their prototypes and verified that their designs functioned similarly to that of a conventional system. Ongoing research on this project will evaluate the efficacy of these engineered drainage tiles to remove nitrates.

All three students presented their summer research at the SCARP Seminar held on July 24, 2013. Additionally, Dan and Anthony plan to present their research at the 2014 Scholarship and Creative Arts Day held on April 15 as well as the 2014 Pennsylvania Water Environment Association's Technical Exhibition and Conference in June.