



Teacher and Student Conduct Research at Northeastern University

FOR THE PAST two summers, Kellie Burtch, a high school science teacher, has headed to Northeastern University to complete research. This past summer, in a separate lab, Chris Kaffine '13 was also doing research on the Boston campus.

Burtch was part of Research Experiences for Teachers (RET), a program for educators from community colleges, high schools, and middle schools. Burtch worked on a research project entitled

Evaluating Potential Swimming Areas in the Charles River Basin, which enabled her to collaborate with a team in the Environmental and Civil Engineering Department to collect and analyze water. "Data are shared with many groups like the Charles River Conservancy and the Department of Recreation to help reach the goal of providing a safe urban swimming area to Boston residents," Burtch reports.

As part of her research, Burtch needed

to bike to sampling locations like the MIT Sailing Pavilion and the Esplanade Dock. "It was great to have a medley of lab work and time outside riding my bike along the Charles River," she says. "Probably the toughest part of the job was not getting

Kellie Burtch works in the lab at Northeastern University preparing a slide of a water sample from the Mystic River to observe *Microcystis*, a type of cyanobacteria (blue-green algae).

lost, or run over, navigating around the busy Boston streets,” she jokes.

In addition to sharing data with numerous organizations, Butch also presented her results to the public in a research poster at Northeastern each summer and at a National Science Foundation Grantee’s Conference last March.

Burtch says the Northeastern University STEM (Science, Technology, Engineering, and Math) program director, Claire Duggan, and the other teachers in the program were enthusiastic about sharing resources and ideas for her classes at Innovation Academy. Northeastern provides funding to help implement lesson plans during the school year. With this funding, Burtch and her students will be able to conduct water quality tests on campus ponds and streams. “This spring, I will be looking for some students to assist in the construction of a rain garden, also known as a bioswale. A rain garden is basically a living filter that helps clean water. They are also attractive and provide food for wildlife!” she says.

IN ANOTHER PART of Northeastern’s campus, Chris Kaffine, a current junior at Innovation Academy, spent six weeks last summer as part of the Young Scholars Program (YSP). The program, designed to get students interested in STEM jobs, shows high school students what research work is like, and what scientific careers look like in the field. After finding out about YSP from Burtch, Kaffine filled out an application. He was one of only 26 students who were accepted into the program.

Kaffine spent three days a week helping graduate students and professors with a research project in a lab. One day a week, the Young Scholars took a field trip to places like iRobot and Biogen Idec. They also saw a number of presentations from researchers and graduate students about the work they were involved in.

Kaffine worked on a project in the Cognitive Systems thinking lab, run by Professor Deniz Erdogmus, which involved

developing a way of interpreting brain signals. “The ultimate goal of the project was to allow people to give commands to a computer by imagining the movement of a hand or arm,” he says. “The particu-

six weeks in the lab. “I learned a lot about what scientific research is actually like. One of the most important things I realized was that failure was a very real possibility. This was very different from

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lar part of the research that I worked on was writing an algorithm that correctly determines whether a certain brain signal represented a right hand movement, or a left hand movement.”

On the last day of the program, instead of working in the labs, all of the YSP students, their families, the professors whose labs they were working in, and other guests were invited to a day of presentations. Each lab group presented the work they had done over the summer. “We spent about a week preparing both a poster and the presentation, while working on the project down to the last possible moments. The presentation was about fifteen minutes long, in which we had to explain what our project was, what work we had done, and what our results were, while making sure that our audience could follow along,” says Kaffine.

Kaffine learned so much during his

anything I might have done in school, where there is always some correct way of doing things. That wasn’t the case with this project because we had limited time and resources, and we could never know if there was really a ‘correct’ way of doing things,” he says. Kaffine was also pushed to learn more math, which was necessary for his project.

Towards the end of his time at Northeastern, Kaffine and his lab partner weren’t sure whether they’d be able to finish their project. They spent a few late days in the lab. “As we got closer, I felt like our algorithms wouldn’t be very successful, which would have been rather disappointing. Then, on the last day we had to work on our project, we managed to get our results back, and found that our algorithms were actually very successful. The relief of being done on time and the satisfaction of seeing our work turn out well made for a great end to the program,” he shares.

As for the future, Kaffine plans on pursuing both an education and career path in a STEM field. “My experiences with this program will help with that. Exposure to some of the processes and skills of research can only help me in the future, especially if I do more research work in particular. It’s made me look forward to doing research in college,” he says.



Chris Kaffine works in the lab at Northeastern University.