

Redoubling Efforts

Kehres, Aronstam, Borland

by NICK CELLUCCI '16

PUBLIC COLLEGES and universities, including Bloomsburg University, are joining the ranks of research institutions by turning new projects and ideas into revenue. Robert Aronstam is doing just that with a protein cloning service he brought with him when he became the dean of BU's College of Science and Technology in July 2015.

Aronstam is a molecular neuroscientist with a career that has included work at the Medical College of Georgia, the Guthrie Research Institute and the Missouri College of Science and Technology. The core of his research is focused on the human brain and synthetic biology, engineering brain proteins that don't exist in nature.

"The brain has 89 billion neurons that squirt chemicals (neurotransmitters) onto each other," Aronstam explains. "When a neuron squirts out one chemical, it interacts with a receptor on the next cell. Binding of the chemical to the receptor, a special type of protein, on the receptive cell turns that cell on or off. Brain function emerges from the total activity of billions and billions of these receptor switches."

Signal transduction refers to the process by which different cells respond to chemical signals from one another.

Aronstam has worked closely with colleagues and former undergraduate and graduate students throughout his career to clone and sequence virtually every receptor and transducer protein used in the brain. That collection is now maintained and being expanded upon by BU students and faculty, including Michael Borland and Ellen Kehres, assistant professors in BU's Department of Chemistry and Biochemistry.

The clones are propagated in bacteria and then frozen for storage. Cloned human proteins are useful for work in a variety of fields, including medical and pharmaceutical research.

"If you're a scientist, the cell is now your test tube," Aronstam says. "You can introduce clones for the proteins you are interested in, have the cell make them, and then determine the effects on cell function."

> *"It's a great training tool. We have BU students who want to learn how to clone and modify cells. We can put them on some immediate projects."*
>
> **– Dean Robert Aronstam**

Researchers can mutate the clones to make proteins with abnormal properties, but it's a lengthy process. That is where Aronstam's work comes into play. Since 2004, he and his colleagues have distributed clones to scientists throughout the world for research purposes.

"You could clone any of these proteins yourself, but it would take you weeks or months," says Aronstam. "If you visit our website, you could receive the clone the next day, and you would know exactly what you are getting."

The high-quality clones now sold by BU can be referenced in an online database. Among them are new proteins and variants discovered by Aronstam and his colleagues over the years.

"Since we had complete collections of high-quality and highly documented clones, we made our clones available to other scientists throughout the world. There was a tremendous demand, and soon we had a thriving business," Aronstam laughs. "So much of what we do in academia has commercial value, and we have to be willing to capture a portion of this and reinvest it in the institution."

At BU, Aronstam envisions the cloning service providing opportunities for institutional growth, scientific discovery and training, especially for students.

Since his arrival in July 2015, BU has sold nearly $80,000 worth of clones through an e-commerce site established by the BU Foundation. "We're closing in on $3 million in sales since 2004. Once we have the clones, it's mainly profits, and it all goes back into the university," Aronstam says. The money is used to maintain the collection, train students and support student and faculty research.

"We've sold to scientists at hundreds of institutions on every continent (except Antarctica)," says Aronstam. "We've been able to support student travel and keep faculty engaged in the research process. That's central to our educational mission of learning and discovery."

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