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Immortal Mortals

By Sterling Giles

Junior Information Systems and Bioinformatics major Michael Kiflezghi focuses his research interests on an organism's lifespan and gut microbial communities.

Kiflezghi said watching *Star Trek: Voyager* when he was young sparked his interest in science, specifically in the field of cosmology. His focus later shifted from the mega-macro to the mega-micro.

Kiflezghi studied at Northern Virginia Community College for two years before transferring to VCU. He decided to pursue bioinformatics because he always found computers easy to navigate and as a result he was a huge asset to his family.

"When you're like the only guy in the family that works with computers, everyone comes to you with every single computer problem," he said.

Kiflezghi currently works on the characterization of the composition of the gut microbiome with Dr. Maria C. Rivera, associate professor in the VCU Department of Biology. The gut microbiome refers to the microbial communities inhabiting the intestine of all animals.

Kiflezghi is involved in a project characterizing alterations to the gut microbiome of mice, with constipation induced by chronic opioid treatment. He is collaborating with Dr. Hamid Akbaral of the VCU Department of Pharmacology & Toxicology and Dr. Tricia Smith of the VCU Department of Biology.

The goal of the project is to understand the side effects of long-term morphine treatment. The work is partially funded by the Jeffress Trust Award and Kiflezghi's participation is funded by his involvement in the IMSD Scholar program at VCU, which is funded by an NIH (National Institutes of Health) grant.

Kiflezghi has a particular interest in caloric restriction and whether the lifespan of an organism can be extended by manipulating its diet. He was given the opportunity to pursue this interest at the Phillips Laboratory at the University of Oregon as part of the university's 2014 summer program for undergraduate research.

Here, he worked with *C. elegans*, a family of microscopic worms, to determine whether caloric restriction will extend the lives of the organisms. The worms were ideal for the project as opposed to mice because they were essentially more cost-effective. They had shorter lifespans, which was crucial due to time constraints for research, and they could reproduce rapidly.

Kiflezghi said he and the research team didn't make any discoveries regarding the lifespans of the *C. elegans*. Rather, they worked to develop new microen-

vironments for the worms to live in to conduct studies.

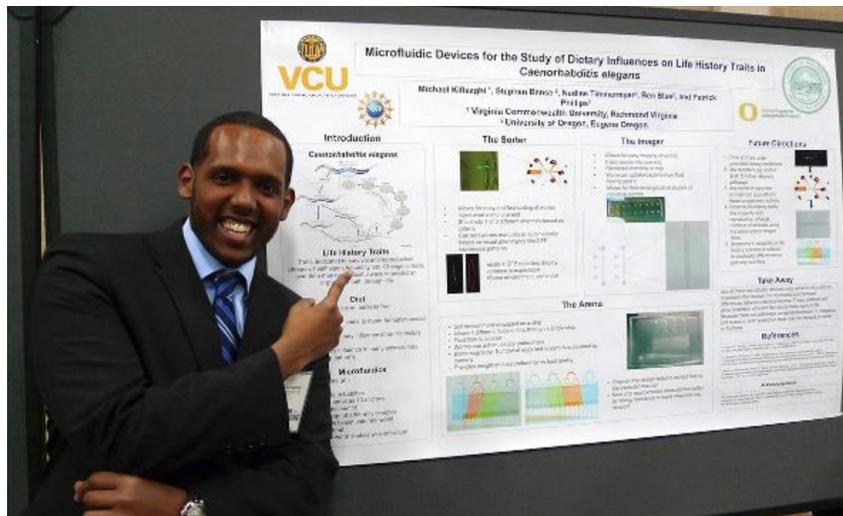
Despite the discoveries with the *C. elegans*, Kiflezghi said such studies would only be representative of human beings if primates were the test subjects. This is due to the fact the genetic makeup of primates closely resembles humans. However, much like human beings, primates have long lifespans. This poses implications because it isn't ideal to conduct studies over extended periods of time; in this case, it would be 20 to 30 years.

Kiflezghi said there have been studies out there that have used rhesus macaque monkeys as test subjects. He mentioned two particular studies both studies, which covered the duration of the monkeys' lifetimes. However, the two had dissenting conclusions about whether choloric restriction extended the lives of the monkeys.

Kiflezghi would like to pursue this study further in his postgraduate studies. He currently has spent over six years as an undergraduate and would like to jump straight to a doctoral degree. Kiflezghi appreciates how supportive his family has been despite his extended undergraduate campaign.

"Everything I went after my parents were like 'Go for it,'" Kiflezghi said.

After graduation, Kiflezghi plans to pursue his doctoral degree in the study of the molecular biology of aging.



Michael Kiflezghi poses with his research from the University of Oregon last summer