

F26.10 The Bottleneck Project - Mapping Animal Genomes to Understand the Genetic Basis of Cancer Risk Across Life

Overview

This intern will join our international team of students, postdoctoral researchers, and scientists who make up the Arizona Cancer Evolution center, including collaborators from Arizona State University, UC Santa Barbara, and Pontifical Catholic University of Ecuador, to work on what we call "The Bottleneck Project". The goal is to understand how genetic variation is related to cancer risk across species. We work with zoo veterinarians and maintain a database of thousands of zoo necropsies. We will map the genomes of 100 mammal species to measure population genetic variation, including inbreeding coefficients, and test models that explain the relationship between homozygosity and cancer prevalence. We will identify genetic predictors of cancer risk in animals, which can help future human therapies.

What the student will DO and LEARN

This intern will be part of the team that downloads genome data for the study species from GenBank, and applies to those datasets bioinformatics mapping and variant calling skills that will be taught to the intern in a series of online workshops. The student will learn how to perform these skills in the NAU high-performance computer environment.

Additional benefits

The computing skills will be very useful for a wide variety of future career opportunities, including graduate study. There is also an opportunity for the intern to become a longer-term participant in the project after the internship. After one year, the intern would be in very good position to apply for a Hooper Undergraduate Research Award with Professor Tollis. Since we are actively seeking NIH funding, additional employment opportunities associated with the project may arise in the future. This project could provide a good environment for a student to write a research thesis for a capstone, and provides opportunities to contribute to research that will be published in scientific journals.

Additional qualifications

Students who have either taken courses or can demonstrate some equivalent interest in biology, genetics, ecology, wildlife, as well as computer science and data science would make good candidates for this internship. Some combination of these topics plus some computing skills (Python, R, UNIX) would be preferred, but not all of them are required for consideration.

Time commitment

6 hrs/week for 30 weeks