

F22.034: The Evolution of Transposable Elements in Reptile Genomes

Faculty mentor: Marc Tollis

Overview

This project focuses on transposable elements in reptiles. Transposable elements are parasitic DNA sequences that comprise large proportions of vertebrate genomes, including ~60% of the human genome. While there are almost 12,000 species of reptile, their genomes are not well-studied. We use bioinformatics to extract transposable element sequences from reptile genomes and use statistical models to reconstruct their evolution. The goal is to compare our results in reptiles to those in mammals in order to determine what drives the evolution of genome structure across the tree of life.

What the student will DO and LEARN

This internship is geared towards students interested in biodiversity and evolutionary research, with a focus on genomics and bioinformatics techniques. The student will learn how to download genomic databases, use search algorithms to find repetitive motifs, perform DNA sequence alignments, and reconstruct the evolutionary history of transposable elements with phylogenetics software. This work is high-throughput (big data) and students will learn how to perform these analyses on NAU's high-performance computing cluster. The student will also gain valuable experience in a team-oriented environment, learning about organismal and evolutionary biology as part of a cohesive team comprised of the professor, a graduate student, and multiple other undergraduate students. We have regular lab meetings where we discuss research results, topics in biology, and funding/fellowship/awards available to students. Student success, both while working with us and beyond in their future careers, is our passion.

Additional benefits

Students who have taken first-year BIO and BIO 240 will be most familiar with the concepts of the project, but we anticipate training students in these areas, so do not be discouraged to apply if you haven't had those courses yet. In particular, data-science oriented students in environmental or computer science with a soft spot for biology may stand to benefit.

Additional qualifications

NA

Time commitment

6 hrs/week for 30 weeks