Detailed Syllabus

Title: Population Genomics and Conservation

Lecturer: Prof. Alan R. Templeton

Course number: 001.2.3081

Credit: 2.5 points

Audience
The course is designed for higher degree (Master and PhD) students, post-docs, and faculty interested in evolution, ecology and conservation biology.

Textbook and Readings
The application of genomics to conservation biology is a relatively new area with a rapidly expanding literature. Much, but not all, of the material in this course can be found in the textbook *Population Genetics And Microevolutionary Theory, 2nd Edition*, Templeton, A. R. (2021), Oxford: Wiley-Blackwell. Additional readings will be assigned from the literature. Given the dynamic nature of the literature on this topic, the decisions on readings will be made closer to the time of the course.

Number of students
Maximum 20.

Prerequisite
Students must have a basic knowledge of genetics and some previous exposure to population biology/ecology.

Requirements
We will need to use the computer room of the Institutes for the workshops.

Lecture/Discussion hours
21 hours (3 or 6 hours/day, split between a lecture and discussion of assigned papers, with a short break in between the lecture and discussion)

Workshop/Discussion hours
10 hours.

Format

The lectures will be presented in Power Point and available to students before the lecture. The students will be assigned readings before each lecture that will be discussed after the formal lecture.

The workshops will involve using non-invasive sampling, highlighting the work done in the laboratory of Dr. Bar-David, and the SNP filtering pipeline developed by Noa Yaffa Kan-Lingwood, a doctoral student, in the computer room to analyze actual data sets.

Topics

Day 1: Morning: New Molecular & Analytical Techniques in Genomics
Afternoon: Characterizing New Species, Communities & Ecosystems, Including The Microbiome

Day 2: Morning: Detecting Endangered & Invasive Species with eDNA
Afternoon: Identifying Old and New Species with Integrated Genetic, Ecological, and Biogeographical Analyses

Day 3: Morning: Using Ancient DNA to Manage the Present & Predict the Future
Afternoon: Workshop on Non-Invasive sampling

Day 4: Morning: Detecting Population Structure & Gene Flow Patterns
Afternoon: Workshop on SNP Filtering; Possible Field Trip

Day 5: Morning: Landscape Genomics, including local adaptation
Afternoon: Discussion on All Course Material