NYU DEPARTMENT OF BIOLOGY

BIOL-UA 500 Environmental and Molecular Analysis of a Disease

Instructors:
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Course Description:
This is an upper-level undergraduate course that will teach students about the environmental determinants of disease vectors, and the molecular techniques used to measure prevalence of a pathogen in these vectors. Students will partake in a semester long research project on Lyme disease, the most prevalent vector-borne disease in the United States. The aim of the project is to determine the prevalence of Borrelia burgdorferi, the Lyme disease causative agent, in tick populations from New York forests. Students will collect ticks, bring them back to the lab and analyze them for the presence of the Borrelia burgdorferi bacteria. Then collected and analyzed data will be fed into epidemiological models to assess human risk of Lyme disease in the studied areas.

Pre-requisite:
Molecular and Cell Biology I (BIOL-UA 21) or
Introduction to Ecology (BIOL-UA 63)

Textbook and Required Materials:
N/A

Grading:

Module One Paper Discussions	15%
Module One Exam:	25%
Website Development	20%
Field Collection (required field trip)	10%
Lab Preparation	15%
Presentation of Results	15%

Topics:
Module 1:
Introduction to Lyme Disease
Ecology of Ixodes scapularis
Methods of collecting environmental samples
Genomics of *B.burgorfery* spirochete
Methods of detection and quantification of spirochetes in environmental samples
Module 2
Field Trip
Module 3:
Real-Time PCR versus regular PCR Tutorial Applied Biosystems
Real Time PCR Application guide. BioRad
Module 4
Data Analysis and Presentation