Course Number & Title: BIOL-UA 700 Evolutionary Zoology

Instructor(s): Matthew Rockman

Course Description: Animals are one of life’s most successful lineages, occupying nearly every environment. This course provides an introduction to the diversity of animal form and function in the context of phylogeny and evolution, with a focus on the invertebrates, the majority of animals. Lectures will be devoted alternately to individual branches of the tree of animals and to common themes in the ways animals have evolved to fit and shape their environments. We will discuss morphology, physiology, reproduction, development, and ecology. We will discuss the unique genomic and molecular characteristics of each branch of animal life, with attention to the ways that nonmodel organisms can provide insights into core cellular and molecular processes, including cell-cell communication and biomineralization. We will also discuss the intersection of these animals with human interests, including economic zoology, ecosystem services, and medicine. In laboratory and field exercises, students will learn to collect and identify invertebrate animals and to form and test hypotheses about their attributes.

Pre-requisites: BIOL-UA 21 and one of the following: BIOL-UA 22; BIOL-UA 63; BIOL-UA 100; or permission of the instructor.

Readings: Papers posted on NYU Classes

Grading Information: Course grades will be based on the following:
- 30% Take-home exams
- 20% Quizzes and discussion write-ups
- 14% Final presentation
- 36% Laboratory notebook

Lecture and Lab Topics:
Lecture 1 Introduction: What are animals?
Lecture 2 Animal origins & Ctenophora
Lecture 3 Porifera and Placozoa
Lecture 4 Cnidaria
Lecture 5 Bilateria
Lecture 6 Xenacoelomorphs and Platyhelminths
Lecture 7 Echinoderms
Lecture 8 Bryozoa
Lecture 9 Annelids
Lecture 10 Life-history evolution
Lecture 11 Deuterostomes
Lecture 12 Urochordates
Lecture 13 Molluscs
Lecture 14 Allometry, heterochrony, and theoretical morphology
Lecture 15 Phanerozoic Faunas and Mass Extinctions
Lecture 16 Micrometazoans
Lecture 17 Introduction to Panarthropoda
Lecture 18 Transitions to terrestrial life
Lecture 19 Parasitism
Lecture 20 Nematodes
Lecture 21 Marine Arthropods
Lecture 22 Terrestrial Arthropods
Lecture 23 The cis-regulatory hypothesis

Lab 1 Foundations: draw, describe, identify
Lab 2 Ctenophores and sponges
Field Trip The River Project, Pier 40
Lab 3 Cnidaria and flatworms
Lab 4 Echinoids and Holothurians
Lab 5 Bryozoa
Lab 6 Annelids
Lab 7 Urochordates
Lab 8 Bivalves
Field Trip Invertebrate zoology and paleontology collections, AMNH
Lab 9 Meiofaunal annelids, rotifers, tardigrades, gastrotrichs; onychophora
Lab 10 Nematodes
Lab 11 Barnacles and decapods
Lab 12 Terrestrial arthropods