

SIO 296 Parasites, Infectious Disease, & Ecology 4 units

Spring 2017; Wed 2-5pm Vaughan Hall 300

Instructor: Ryan Hechinger

Course summary: An overview of how infectious disease and parasites—which have the most common consumer strategy on Earth—impact our understanding of fundamental ecological patterns and processes. The course format is a combination lecture and critical discussion of lecture topics/assigned readings. This course counts as a seminar class for graduate students.

Our general consideration will be (1) whether and how parasites and infectious disease are important for the basic ecological issues, and whether basic issues apply differently (2) to parasites vs free-living species and (3) in marine vs terrestrial ecosystems. We will improve our understanding of basic ecological concepts, patterns, and processes, while better understanding parasites, parasitism, and infectious disease, and how they can influence our research. When possible, we will focus on marine systems.

We'll meet for 3 hours once per week, and it'll be a hybrid lecture/grad-seminar class. That is, I'll do a lecture to set the stage for the assigned readings. Students will read those (and find additional) papers during the week, and, in the next class session, we'll critically discuss the readings. Students will sign up to lead at least one week's discussion. Leaders don't really "present" the papers. They are responsible for chaperoning and enhancing discussion among people who have already carefully and thoughtfully read the readings and have done the extra scholarship. After discussion, I'll do the lecture for the next topic and papers.

In addition to thoughtfully going through the assigned readings and participating in weekly discussions, students will, almost every week, find and provide a written summary^s of two additional primary literature papers that are conceptually relevant to the previous lecture, but are something different than what was in the lecture's case studies. At least one of these papers should have material suitable for including in the lecture (e.g., they represent a noteworthy case study or interesting issue that the lecture could have included). The goal is to not only to further develop critical (mad) scholarship skills, increase one's knowledge, enhance our discussion, but also to critically consider lecture content and amp up teaching skills. On our last day, as a group, we will evaluate each lecture's topics and put the papers found by the students into context.

^sEach week, for each additional primary lit paper, students provide one to several sentences for each of the below (ideally, these will be emailed to me as word documents **before** the class):

1. paper citation, 2. main question(s), 3. how tackled, 4. main reported findings, 5. reported implications, 6. your take on how well the above were done, 7. how relevant to lecture and/or field.

In the last class, we'll go over all these write ups. This will serve as a refresher and enhancement of where we've been.

Draft schedule on next page

Week	Date	Part	Content
1	5-Apr	Discussion	Logistics
		Lecture 1	Setting the stage: parasites, infectious disease, & ecology. <ul style="list-style-type: none"> • Definitions and concepts: trophic strategies, infectious disease. • Major players in the ocean. • Parasite population & community structure
2	12-Apr	Discussion	Of previous readings: Leader:
		Lecture 2	Parasites & individuals, populations <ul style="list-style-type: none"> • Impacts on individuals: (size, growth rate, reproduction, color, shape, behavior) • Influence on populations (dynamics, SFDs, dispersion; basic consumer-resource dynamical models)
3	19-Apr	Discussion	Of previous readings: Leader:
		Lecture 3	Parasites & competition, predation <ul style="list-style-type: none"> • Parasite-mediated competition (keystone roles, apparent competition); parasites as competitors with free-living consumers • Parasite-parasite competition
4	26-Apr	Discussion	Of previous readings: Leader:
		Lecture 4	Parasites & predation, intraguild predation <ul style="list-style-type: none"> • Parasite increased vulnerability to predation • Parasite increased trophic transmission • Parasites as prey, concurrent predation, intraguild predation
5	3-May	Discussion	Of previous readings: Leader:
		Lecture 5	Parasites & communities, food webs, ecosystems <ul style="list-style-type: none"> • Ecosystem engineers (NZ mudflats), trophic cascades (urchin- lobster?), <i>Littorina</i> grazing and alga community, parasites in topological food webs, ecosystem biomass and energy flow.
6	10-May	Discussion	Of previous readings: Leader:
		Lecture 6	Parasites & the Metabolic Theory of Ecology <ul style="list-style-type: none"> • Scaling with body size and temperature of metabolic rates, life history variables. Consumer-resource body-size ratios. MTE abundance theory and energy flow in food webs. Taylor's Law, etc. • Parasite abundance in host bodies.
7	17-May	Discussion	Of previous readings: Leader:
		Lecture 7	Parasites & macroecology, biogeography <ul style="list-style-type: none"> • Latitudinal gradients (diversity, interactions). • Janzen-Connell Hypothesis • Range shifts and parasites
8	24-May	Discussion	Of previous readings: Leader:
		Lecture 8	Parasites & species invasions, biological control <ul style="list-style-type: none"> • Enemy release, dilution, amplification
9	31-May	Discussion	Of previous readings: Leader:
		Lecture 9	Parasites & applied ecology: environmental parasitology, conservation <ul style="list-style-type: none"> • Parasites and anthropogenic impacts, ecological indicator tools, host diversity and disease dilution/amplification, emerging infectious diseases
10	7-Jun	Discussion	Of previous readings (maybe do none) Leader:
		Lecture 10	Wrap up. Brief presentations of papers. <ul style="list-style-type: none"> • We'll go over how the papers people found relate to the lectures, which will serve as to review of where we've been and to broaden our knowledge.