

Ecology and Evolution of Infectious Diseases, Spring 2013
EEB 228b/728b (EMD 728b)
T TH 10:30-11:20 AM, OML 202

Instructor: Dr. Paul E. Turner (paul.turner@yale.edu)

Teaching Assistants: Valerie Morley (valerie.morley@yale.edu)

Katharine Walter (katharine.walter@yale.edu)

Prerequisite: EEB 122 (Principles of Evolution, Ecology & Behavior), or permission

Discussion Sections: Meet weekly beginning in Week 3 of the course

Reading Assignments: Textbook: "Spillover" by David Quammen

Journal Articles: Posted on Classes*v2

Date	Topic
Week 1	
1/15	Introduction: parasites, pathogens and disease
1/17	Impact of parasites on ecosystems and communities
Week 2	
1/22	Transmission and fundamental epidemiology
1/24	Parasite regulation of host populations
Week 3	
1/29	Host defense and parasite counter-defense
1/31	Parasite spread in space and through time
Week 4	
2/5	Vector-borne diseases
2/7	Emergence
<i>Students choose a parasite for paper topic; first come, first served. There are <u>no</u> shared topics.</i>	
Week 5	
2/12	Vaccine strategies and disease management
2/14	Vaccine-induced evolution, and ethics of pathogen eradication
Week 6	
2/19	Virulence
2/21	Parasite interactions, and host-parasite co-evolution
Week 7	
2/26	Behavioral effects of parasitism
2/28	First Midterm
Week 8	
3/5	Impacts of parasites on host genomes
3/7	TBD
<i>Students hand in 5 journal article references in the ecology, or evolution of parasite/disease.</i>	
Weeks 9 - 10 (SPRING BREAK)	
NO CLASS	
Week 11	
3/26	Sex and its evolutionary consequences for hosts and parasites
3/28	Smallpox and the ethics of forced extinction
Week 12	
4/2	Evolutionary consequences of HIV and other retroviruses
4/4	Malaria in humans and other hosts
Week 13	
4/9	Infectious disease in cinema
4/11	Ecology and evolution of influenza viruses
Week 14	
4/16	Cultural and economic consequences of agricultural disease
4/18	Disease consequences in wildlife conservation
Week 15	
4/23	Prions and transmissible cancers
4/25	Second Midterm

Final papers are due by 5 pm on Mon May 6, 2013. Undergrads should email their paper to the TA for their section. Grad students should email their paper to Prof. Turner.

Grading: Undergraduate Students

First Midterm: 30%

Second Midterm: 30%

Final paper: 20%. The final undergraduate paper is a maximum of 6 pages (single spaced in a legible font). The assignment is to write a paper that describes the ecology and evolution of a parasite or infectious disease that occurs in humans, other animals or plants. The paper must be based on information obtained from the primary published literature (i.e., journal articles), which you cite in your paper. A suggested content is to use roughly 1 page to describe the basic biology of the parasite/disease system, 3 pages to describe the known ecology and evolutionary biology of the system, and 2 pages to imaginatively discuss the future of the disease system. A focus of the latter discussion might be (but is not limited to) the following. Is the disease likely to be more or less problematic in the future; why or why not? Are there principles of ecology and/or evolution presented in the course which may apply to the disease system, but have not previously been the subject of study? Are there similarities between your chosen disease topic and others you have learned about in the course, which suggest novel approaches for future study?

Discussion section: 20%. Sign up for a discussion section in Week 2 of the course. Discussion sections begin meeting in Week 3. Discussion sections are mandatory; grade based on attendance, preparation, and participation.

Grading: Graduate Students

First Take-home Midterm: 30%

Second Take-home Midterm: 30%

Final paper: 20%. The final graduate student paper is a maximum of 10 pages (single spaced in a legible font). The assignment is to write a mock research proposal to a funding agency such as CDC, NIH, NSF, or USDA. This proposal describes a 1 to 3 year research plan to examine the ecology and evolution of an infectious disease that occurs in humans, other animals or plants. The chosen study system must be different than the system used in your current or planned thesis research. The proposal should contain ~2 pages of Background and Significance that is used to briefly describe the background biology of the disease system, and the need to perform research in this area. You should include ~2 pages of Preliminary Results, which describe published data obtained by other researchers and relevant to the novel research you will propose. The remainder of the proposal is the Research Plan, describing the 1 to 3 years of proposed studies and how the resulting data might be analyzed. At the end of the proposal include a short section on Outreach, where you describe efforts that could be used to disseminate the results to the general public, such as presentations in school classrooms or museum exhibits, software development or via the media.

Discussion section: 20%; Grad student discussion section begins meeting in Week 3 of the course. Unless otherwise announced, the Grad Student Discussion section will meet in OML 551 from 11:30 am to 12:30 pm on Tuesdays. Discussion section is mandatory; grade based on attendance, preparation, and participation.

Office hours:

Instructor – Dr. Turner’s office is in Osborn Memorial Labs room 301A; office hours Thursday 1 – 2 p.m. and by appointment (paul.turner@yale.edu)

T.A.’s – Office hours are by appointment (valerie.morley@yale.edu; katharine.walter@yale.edu)

Recommended books if you are seeking my permission to bypass the EEB122 prerequisite:

“Evolution: An Introduction” by Stearns and Hoekstra

“Introductory Ecology” by Cotgreave and Forseth