

## Welcome to Community Ecology BI 472/572

### About the Course

**Instructor:** Brendan Bohannon

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**Class hours and room:** TTh 10:00 – 11:20AM, B040 PSC (the Allan Price Science Commons & Research Library)

**Office Hours:** Tuesdays 11:30AM - 12:30PM and by appointment.

**Prerequisites:** BI 370 Ecology (or equivalent). Please check with me if you are missing the prerequisite. A course in Statistics is recommended, and courses in Calculus and/or Population Ecology (e.g. BI 471) are helpful.

**Web Site:** Our web site is accessible via the UO Canvas server. Login requires your UO Information Services (Computing Center) email address and the corresponding password.

**How I will contact you:** All of my communication to you outside of class will take place via email. Specifically, I will use the email registered to you by the University of Oregon. If you use another ISP for your email, make sure you arrange to have your UO email forwarded to it, or arrange to change your registered email address with UO.

#### Required readings and assignments:

I will be assigning reading from a variety of sources. By 5:00PM Friday, I will have posted the next week's readings and writing assignment on the class website. Most of the readings will be available for download as pdf files. To read these you will need Adobe

Acrobat Reader, free software that is installed on UO computers and can be downloaded from the following website:

<http://www.adobe.com/products/acrobat/readstep2.html>

There is a textbook available for this course: Community Ecology by Gary Mittelbach. I will be assigning background reading from this text, and the course outline will generally follow the outline of the book. A copy of the text is available on reserve in the Science Library.

### About Community Ecology

Community ecology is a subdiscipline of ecology that studies the properties of species assemblages.

Community ecology arose at the end of the 19th century as an attempt to understand the "balance of nature". Given the bewildering variety of species that can be found in a prairie, pond, or forest, naturalists were curious why there were repeated patterns of species composition and life form. Community ecology seeks to answer these and related questions.

The central questions of community ecology are:

- 1) How do communities form (i.e. what are the processes that allow species coexistence) and what causes communities to change?
- 2) How are communities organized (i.e. are there regularities in the structure of communities)?

- 3) What are the attributes of communities (i.e. how does one describe and compare communities) and what causes variation in these attributes?
- 4) What patterns do communities exhibit in space and time, and why?

We will explore these and related questions during this course.

Community ecology is also a foundational science for many applied disciplines, including conservation biology, the study of invasive species, environmental management, and environmental engineering. We will have the opportunity to discuss examples of these applications during this course.

## About Me

I joined the University of Oregon faculty in September of 2006, after 8 years on the faculty at Stanford University. My research group studies the community ecology of microorganisms (viruses, bacteria, archaea, and microeukarya), using a combination of laboratory microcosm experiments and field studies using molecular techniques. I am particularly fascinated with the diversity of microbial life and much of my research is focused on the causes and consequences of microbial biodiversity.

## Course Goals

I have two goals for this course.

**Help you learn some of the central ideas in community ecology**—This course is not a panoramic overview of community ecology. Community

ecology is a very broad and integrative science. In a 10 week course an overview could only be cursory. I feel strongly that as upper division and graduate students you will learn more if we take the time to explore in detail some of the major controversies and hot topics in community ecology.

**Help you continue your transition from student to scholar**—A scholar is someone who can think critically, argue logically, write clearly, and read effectively. Most importantly, a scholar understands how to organize and use knowledge, and takes responsibility for their own learning. My goal is to provide you with opportunities to practice all of these skills.

Critical thinking involves using a variety of forms of information, synthesized logically, to solve a problem. Critical thinking is a key tool for any educated citizen of the planet, and is essential for a practicing scientist. It will be my job to give you a structured opportunity to practice critical thinking by interacting with the literature, your colleagues, and me. This means giving you readings and assignments that allow you to stretch your mental muscles a bit.

A great way to practice critical thinking is to write out your argument--an idea that sounds great in your head may be less wonderful when down on paper. In this class, you will write short paragraphs and longer essays that ask you to synthesize and apply what you have learned.

The primary literature remains the first front in the advance of science. The quantity of the literature is growing exponentially. Reading it *effectively* is a skill that can be learned and practiced.

## **Strategy for Achieving these Goals**

By now, 95% of your education has likely been structured around lectures. Lectures are good tools for downloading information. They require a particular dynamic. This dynamic, bluntly stated, is “professor professes, student writes it down”. Lectures, however, are pretty lousy ways to learn how to engage the literature and to learn how to read and think like a scientist. Instead, we will use the following tools to work on these skills.

**Readings and the case method**—We will use the case method to dissect the readings. Through this analysis, we get to know the material by working with it, not by memorizing it. Thus for a typical class, you will be given a background reading, one or two readings from the scientific literature, plus some study questions. During the class period we will work our way through the readings in order to better understand the context of the research, its major findings, its flaws and strengths. We may do in-class exercises that will help us explore the ideas in the readings. These exercises may take the form of debates, small group discussion of a scientific question, a computer simulation or other exercise.

**Essay Paragraphs**—Each week, you will be asked to write a short essay on a study question or questions key to understanding that week’s topic. These essays are an opportunity to get some feedback on your writing and to engage with the material.

**Research Proposal** — You will have an opportunity to work with ideas from community ecology by writing a research proposal. I will give you a handout describing this assignment in

more detail later. In brief, you will write a proposal in small groups (2 - 3 students). You will begin by deciding (in consultation with each other and with me) on a topic for your proposal. You will then write a short literature review (1 – 2 pages) on your research topic, and craft a 5 page research proposal (including information from your review). Near the end of the term the class will be divided into two groups, and each group will read the other groups’ research proposals, write reviews of each, and choose the best proposal for “funding”. You will be given the reviews of your proposal and will have the opportunity to revise it before it is given a final grade. Your grade for the proposal assignment will be based on your literature review, your initial proposal, your participation in the review process (including the reviews you write) and your revised proposal.

**Take-home exam** — There will be a midterm exam in this class. This exam will be a “take-home” exam and will consist primarily of questions you will have already encountered as study questions, or as questions posed in class. This is an opportunity for you to think more deeply about the course topics and to demonstrate your progress in understanding the material.

**Grading** — Your final grade will depend on your performance on the weekly essay questions (40%), the midterm (20%), and the group project (40%). In-class participation is very important in a discussion-centered course such as this one. You will not be graded down if you choose not to participate, but I may increase your grade by up to half a grade for exemplary participation.

**Tentative Deadlines**

(by 10AM, unless stated otherwise)

Groups assigned: January 17.

Proposal topic due: January 24.

Literature review due: February 7.

Midterm handed out: February 7.

Midterm due: February 14.

Proposal due: March 2.

Proposal reviews due: March 9.

Revised proposal due: March 16.

**Tentative course schedule**

The topics on the tentative outline below are subject to change. The time schedule is just a guess -- we will take as long as needed on each subject.

Week	Dates	Topic
1	January 10 & 12	What is community ecology?
2	January 17 & 19	Biodiversity
3	January 24 (no class on the 26 <sup>th</sup> )	Predation & parasitism
4	January 31 & February 2	Interspecific competition
5	February 21 & 23	Facilitation & mutualism
6	February 14 & 16	Community networks, food chains, food webs
7	February 21 & 23	Metacommunities, spatial ecology
8	February 28 & March 2	Disturbance & succession
9	March 7 & 9	Community assembly; Discussion of proposals
10	March 14 & 16	Community evolution; Course synthesis