

## EEB 8990, Section 4 – Animal Communication

**Instructor:** Mark Bee  
312 Ecology  
612-624-6749  
mbee@umn.edu

**Times & Locations:** Mondays 2-4pm, 505 Ecology

**Copy Code:** 1088990

**Instructor's Objectives for the Course:** This graduate-level behavior seminar has two primary objectives:

**Animal Communication:** Our first objective will be to explore major topics in animal communication. The format of the course will be a mixture of lectures and discussion with an emphasis on reading primary literature. As one of the most interdisciplinary fields in all of biology, understanding animal communication requires an understanding of cell biology, development, ecology, endocrinology, evolution, genetics, learning theory, neurophysiology, and even physics and economics! Over the course of the semester, we will likely draw on each of these disciplines to understand the mechanisms, function, and evolution of animal communication systems. We will focus primarily on the physical properties of signals, the production and propagation of signals, the functions of signals, and current issues in the evolution of signals and signaling behaviors.

**College Course Design:** As future professors, a part of your job will be to develop and teach new courses. During your first year on the tenure track, designing your courses will take up an enormous portion of your time. Yet, graduate students in the biological sciences often have few hands-on opportunities to participate in the design of new college-level courses as part of their professional training. Our second objective in this seminar will be to explore aspects of college course design. In the future, Animal Communication will be offered as a regular course for graduate/upper-division-undergraduate students. So as we cover topics in the course, you will participate in various aspects of college teaching, such as making decisions about content, writing and giving lectures, creating in-class and homework assessments and exams, and the use of technology in teaching. One aim will be to create a web-based, multi-media teaching archive that includes audio and video examples of animal communication. We will make extensive use of WebVista in this course.

**Student Responsibilities:** This will in large part be a student-led seminar that will occur within a framework that is aimed at achieving the two goals stated above. Here is a breakdown of what to expect:

**Assigned Readings:** Each week, there will be several assigned readings that will be posted on a WebVista site for the course. These readings will come from the primary literature and from books on animal communication. All students are responsible for reading these materials before coming to class and should be prepared to discuss them in class.

**You in the Driver's Seat:** During one week of the semester (possibly two depending on final enrollment), you will lead the course!! This will involve selecting appropriate primary literature for that week's assigned readings, presenting a lecture on the topic at the undergraduate level, designing a quiz over the material you select, facilitating a discussion of that week's topic following your lecture, and making all of this accessible on the course WebVista site. In

addition, you will have the opportunity to work in groups to design a mock exam over the materials covered in this seminar. I've provided more detailed information below.

Web-based Discussion: In this course, we will explore the use of an online threaded Discussion forum. For each week, you are required to post at least one question/comment for the weekly discussion that is based on the readings for that week. This could be anything, ranging from "I don't get Figure 2; can someone help?" to a more detailed and thoughtful critique of one of the readings. This will be a "threaded discussion", meaning that all students will be able to read and reply to your posting. I don't want this to turn into "busy work", but I do expect us to explore this use of technology for the course. Discussion leaders (i.e., YOU at least one week) will likely find this threaded discussion very helpful in preparing for the week that you lead the course.

### **Course at a Glance:**

Weeks 1: The first week of the semester will serve as a course introduction. In Week 1 we will have a general course overview and we will briefly discuss the field of animal communication and various teaching tips. We will also have an introduction to the use of WebVista in the course for those who are less familiar with this technology.

Weeks 2-7 and 9-14: Over these 12 weeks, a different student will lead the class each week. It is anticipated that each student will lead one class during the semester, but we may have to modify this based on enrollment. Keep in mind that during this week ***YOU are the instructor!!*** For the week that you lead the class, you will have the following responsibilities:

1. Readings: For each week, I have selected at least one "core reading". You will select 1-2 additional readings from the relatively recent primary literature (say, since 2000) on the topic of the week and post these to the course WebVista site one week prior to the week in which you lead the class.
2. Quiz: Prepare a short 5 minute "quiz" over the assigned readings. Students who are not leading the class that week will take your quiz at the beginning of the class you teach. (Note, these are not for grades in this seminar course!!) Your quiz should cover "general" things about the reading, and not nitpicky questions about details. However, your quiz could, for example, ask students to interpret various graphs in the papers if your quiz reproduces these! In a real course, the motivation behind this quiz would be to encourage students to read the papers before coming to class!
3. Lecture: Following the quiz, you will give a standard 50-minute PowerPoint-based lecture on the topic. You should aim to give a lecture at a level appropriate for undergraduate students who have taken an introductory course on animal behavior. In your lecture, you are encouraged to include as many of the following as possible:
  - a. a broad overview of the topic
  - b. real examples from the literature, especially ones that require students to do some critical thinking about actual data!
  - c. an active learning component (this is wide open and up to your own discretion)
  - d. one or more examples using multi-media (there are lots of things on the web that can serve this purpose, including sounds and videos of animals communicating!)
4. Discussion: Prepare a list of discussion questions on the topic that are taken from the assigned readings. You should plan to use these questions to lead a thoughtful in-class discussion on the topic following your lecture. This should last about an hour. Keep in

mind, you are not responsible for doing all the talking (this will be done by everyone!), rather, your job is to be prepared to facilitate the discussion.

5. WebVista: You will be responsible for using WebVista for this course. This will include posting all content for the week you lead the class (readings, lecture, lecture notes, quiz, discussion questions, and multi-media content) to the WebVista site at least 24 hours in advance of your lecture (one week in advance for readings!).

Weeks 8 & 15: You will find that one of the most challenging aspects of being a university professor is designing exams for your courses!! During weeks 8 & 15, you will work outside of class in groups to design an essay exam. In Week 8, the students who have given lectures in the preceding weeks will work to make the mid-term exam. In Week 15, those students who have given lectures between Weeks 9-14 will work together to make the final exam. Each exam will be worth 100 points and will consist of five 20-point essay questions that you select as a group. To facilitate making the exam, each student in the group will contribute 2-3 essay questions to their group on the topic that they covered in their individual lecture. These 10-15 questions will be compiled and posted to WebVista as a sort of “study guide”. In addition, each student will be responsible for writing and submitting to the group a “rubric” describing the ideal answers to their questions and how the 20 points for the question would be assigned/deducted for various answers that might be anticipated from undergraduate students. (Examples of this will be provided!) The actual exam will comprise a selection of 5 of these questions that cover the assigned material, and the group is to make this selection together and present the exam to the rest of us. The entire class will discuss the group’s study guide and exam during our regular meeting time during Weeks 8 & 15.

**Grading**: Obviously, I don’t expect that any of you would ever give it less than your best, so I don’t anticipate grading issues at all. (This, of course, might be different at the undergraduate level!) For those taking this course S/N, here are the general expectations for an S:

- Read all of the assigned readings.
- Show up to class on time and prepared to discuss the assigned readings.
- Contribute to group work and assignments related to creating exams.
- Put in the effort required to successfully lead class during the week you are selected to do so. This means selecting good papers, writing a good quiz and discussion questions, and giving a lecture that is thoughtful, informative, and well-organized.

**Journals that Publish Studies on Animal Communication**: You may find the following journals helpful for finding primary literature on animal communication:

*Acta Ethologica*  
*Animal Behaviour*  
*Animal Cognition*  
*Behaviour*  
*Behavioral Ecology*  
*Behavioral Ecology and Sociobiology*  
*Bioacoustics*  
*Ethology*  
*Evolution*  
*Journal of the Acoustical Society of America*  
*Journal of Comparative Physiology A*

*Journal of Comparative Psychology*  
*Proceedings of the Royal Society*

**Some taxon-specific journals**:

*Auk* (birds)  
*The Condor* (birds)  
*Journal of Mammalogy* (mammals)  
*American Journal of Primatology* (primates)  
*Copeia* (herps)  
*Journal of Herpetology* (herps)

**Course Web Page (<https://www1.webvista.umn.edu/webct/logon/356638611121>):** For this course, we will be using **WebVista**. You will all have instructor/designer privileges for our course site and can directly access the course at the above URL. The site will have copies of the syllabus, readings, lectures and lectures notes, discussion questions, quizzes, and other course materials that may be posted at different times throughout the semester. Our use of technology will sometimes make students' names and U of M Internet IDs visible within the course website, but only to other students in the same class. Since we are using a secure, password-protected course website, this will not increase the risk of identity theft or spamming for anyone in the class. If you have concerns about the visibility of your Internet ID, please contact the course instructor for further information. **THIS IS IMPORTANT:** To access the site, your web browser must be properly configured (see <http://webct.umn.edu/browser>). You can access the course WebVista site by following the URL provided above or by logging on to your MyU portal at [myu.umn.edu](http://myu.umn.edu). If you have trouble logging in, contact 612-301-HELP. For additional help using WebVista, please contact the Technology Helpline at 1-HELP (612-301-HELP) or by email at [help@umn.edu](mailto:help@umn.edu). You can also receive context-specific help by using the online Help link available in the navigation bar for the course. You may also find the following websites helpful:

WebVista Student Support Menu: <http://webct.umn.edu/students/>  
How to Configure Your Browser: <http://webct.umn.edu/browser/>  
Student Online Tutorial: <http://uttc.umn.edu/training/resources/webct/vista/>

**Course Schedule & Selected Core Readings:**

**Week 1 – 28 Jan – Course Overview / WebVista Introduction / Teaching Tips**

*(Read only the following papers...)*

- a. McKeechie Chapters 4, 5, 9, 14, 15, 16
- b. McGregor Chapter on Communication

**Week 2 – 4 Feb – Historical Perspectives on Communication**

*(Read only the following papers...)*

- a. Smith 1965
- b. Dawkins & Krebs 1978
- c. Hinde 1981
- d. Wiley 1983
- e. Krebs & Dawkins 1984

**Week 3 – 11 Feb – A Detailed Look at One Sensory Modality: Acoustic Communication**

*(Read only the following papers...)*

- a. Bradbury & Vehrencamp, Ch. 4 in *Principles of Animal Communication*
- b. Bradbury & Vehrencamp, Ch. 5 in *Principles of Animal Communication*
- c. Bradbury & Vehrencamp, Ch. 6 in *Principles of Animal Communication*

**Week 4 – 18 Feb – Evolution of Signals & Signaling Behaviors**

- a. Bradbury & Vehrencamp, Ch. 16 in *Principles of Animal Communication*

**Week 5 – 25 Feb – Costs and Constraints on Signal Evolution**

- a. Bradbury & Vehrencamp, Ch. 17 in *Principles of Animal Communication*

**Week 6 – 3 Mar – Signal Design Rules**

- a. Bradbury & Vehrencamp, Ch. 18 in *Principles of Animal Communication*

**Week 7 – 10 Mar – Receiver Psychology**

- a. Guilford & Dawkins 1991
- b. Rowe 1999

**No Class – 17 Mar – Spring Break!**

**Week 8 – 24 Mar – Group Work: Design and Discussion of a Mid-term Exam**

**Week 9 – 31 Mar – Game Theory & Signaling Strategies**

- a. Bradbury & Vehrencamp, Ch. 19 in *Principles of Animal Communication*

**Week 10 – 7 Apr – Honesty & Dishonesty in Signaling**

- a. Greenfield 2006

**Week 11 – 14 Apr – Communication and Sexual Selection**

- a. Ryan and Keddy-Hector 1992

**Week 12 – 21 Apr – Recognition Systems**

- a. Sherman et al. 1997

**Week 13 – 28 Apr – Communication Networks**

- a. Peake, Ch. 2 in *Communication Networks*
- b. Dabelsteen, Ch. 3 in *Communication Networks*

**Week 14 – 5 May – Birdsong & Human Language**

- a. Doupe & Kuhle 1999

**Week 15 – 12 May – Group Work: Design and Discussion of a Final Exam**