

IB 546: Principles of Neuroethology

Spring 2023 – Topics in Ecology & Evolution

General Information

Instructor: Dr. Daniel J Miller, PhD

Email: millerdj@illinois.edu

Office hours: by appointment, Morrill Hall 665D

Seminars: 1 credit, timing TBD

Meeting Time: To be determined (Friday 11 am)

Meeting Place: Morrill Hall Room Conference Room 515

Readings: Our primary text is Sensation and Perception (Goldstein & Brockmole, 10th Edition), with a few select readings from Evolutionary Neuroscience (Jon H Kaas (editor), 3rd Edition), and a few select publications.

Course Description: A seminar on the neural mechanisms of behavior, from basic perception to sensorimotor integration to memory systems and executive function. We will read through most chapters within the classic textbook, Sensation and Perception (10th edition), as well as a few supplementary readings from Evolutionary Neuroscience (3rd Edition, Jon H Kaas). We will discuss the main systems within the brain, and how interactions within and between these systems over the course of development produce behavior. In this seminar, we will emphasize the integrated nature of central representations of ecological signals transduced by peripheral detectors, and discuss the challenges and opportunities of converging neural solutions to reveal the selective pressures acting to shape brain organization and function across taxa.

Learning Objectives: Explain the main processes by which ecological signals shape animal behavior. Describe the principal strategies that scientists use to interrogate brain-behavior relationships. Create and deliver an oral presentation on some aspect of neuroethology.

Expectations: As a graduate seminar, each student is expected to read prior to class, and to come to class prepared to **discuss what they did and did not understand**. Each student will select a topic for presentation, and lead the discussion for that day. As a seminar, there is no formal evaluation, and participation is the main requirement. Grading is S/U. Approximately 3 hours of work will be required each week to complete all learning objectives.

Maintaining a good learning environment

General Etiquette

We expect everyone to be respectful of each other. During seminar, we should all maintain an environment conducive to learning and refrain from interrupting the course environment. Harassment or other like misconduct will not be tolerated. The effectiveness of this course is dependent upon the creation of an encouraging and safe classroom environment. Exclusionary, offensive or harmful speech (such as racism, sexism, homophobia, transphobia, etc.) will not be tolerated and in some cases subject to University harassment procedures. We are all responsible for creating a positive and safe environment that allows all students equal respect and comfort. We expect all of us to help establish and maintain an environment where we can contribute without fear of ridicule or intolerant or offensive language.

Online Etiquette

Online interactions can easily become heated and fraught. Typing something rashly can happen to the best of us on accident. This means that we have to be kind toward and cognizant of everyone around us when we participate in the forums or other discussions. With this in mind, let's follow these best practices.

- Write or speak in a way that is affirming of everyone's right to be a member of the class. We will all get more out of the course if we conduct ourselves in neighborly and gracious ways.
- Stay on topic. Posts to the website and questions or comments during lectures and discussion should pertain directly to the topic at hand. Do not post anything that might be regarded as harassing or inflammatory. If you have a question about a specific item that you would like to post but are worried that it may not be appropriate, please feel free to consult with us about it.
- Respect one another's privacy. If someone does not want to engage with you on a topic, respect their decision and leave them be. Likewise, in a highly connected environment, it is very easy to pester someone to the point where they feel they are being stalked. Moderate your communication to what is necessary and respect people's boundaries.
- Don't type in anger or frustration. It is very easy to type things you wouldn't ordinarily say to someone in a face to face setting. If you are feeling upset or excited, take in a breath of fresh air and give what you want to say some thought.
- Expect to be welcomed and respected. If you find yourself in a situation where you feel put upon by others, be sure to contact us about it and the problem will be corrected.

Request for Accommodations

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@illinois.edu. Also visit <http://www.disability.illinois.edu/>.

Academic Integrity & Inclusivity

The University of Illinois at Urbana-Champaign *Student Code* should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>. Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <http://studentcode.illinois.edu/>. Ignorance is not an excuse for any academic dishonesty. It is your

responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

Family Educational Rights and Privacy Act (FERPA)

Any student who has suppressed their directory information pursuant to *Family Educational Rights and Privacy Act* (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <http://registrar.illinois.edu/ferpa> for more information on FERPA.

Religious Observances

The Religious Observance Accommodation Request form is available <https://odos.illinois.edu/community-of-care/resources/students/religious-observances/>. Submit the form to the instructor and to the Office of the Dean of Students (helpdean@illinois.edu) by the end of the second week of the course; in the case of exams or assignments scheduled after this period, students should submit the form to the instructor and to the Office of the Dean of Students as soon as possible.

Sexual Misconduct Policy and Reporting Statement

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: <https://wecare.illinois.edu/resources/students/#confidential> Other information about resources and reporting is available here: wecare.illinois.edu.

Community of Care

As members of the Illinois community, we each have a responsibility to express care and concern for one another. If you come across a classmate whose behavior concerns you, whether in regards to their well-being or yours, we encourage you to refer this behavior to the Student Assistance Center (217-333-0050 or <http://odos.illinois.edu/community-of-care/referral/>). Based on your report, the staff in the Student Assistance Center reaches out to students to make sure they have the support they need to be healthy and safe. Further, we understand the impact that struggles with mental health can have on your experience at Illinois. Significant stress, strained relationships, anxiety, excessive worry, alcohol/drug problems, a loss of motivation, or problems with eating and/or sleeping can all interfere with optimal academic performance. We encourage all students to reach out to talk with someone, and we want to make sure you are aware that you can access mental health support at the Counseling Center (<https://counselingcenter.illinois.edu/>) or McKinley Health Center (<https://mckinley.illinois.edu/>). For mental health emergencies, you can call 911 or walk in to the Counseling Center, no appointment needed.

General Guidelines regarding COVID

Following University policy, all students are required to engage in appropriate behavior to protect the health and safety of the community. Students are also required to follow the campus COVID-19 protocols. Students who feel ill must not come to class. In addition, students who test positive for COVID-19 or have had an exposure that requires testing and/or quarantine must not attend class. The

University will provide information to the instructor, in a manner that complies with privacy laws, about students in these latter categories. These students are judged to have excused absences for the class period and should contact the instructor via email about making up the work. Students who fail to abide by these rules will first be asked to comply; if they refuse, they will be required to leave the classroom immediately. If a student is asked to leave the classroom, the non-compliant student will be judged to have an unexcused absence and reported to the Office for Student Conflict Resolution for disciplinary action. Accumulation of non-compliance complaints against a student may result in dismissal from the University.

Emergency Response Recommendations

Emergency response recommendations can be found at the following website:

<http://police.illinois.edu/emergency/>.

I encourage you to review this website and the campus building floor plans website within the first 10 days of class. <http://police.illinois.edu/emergency/floorplans/> .

Schedule

Date	Topic	Title
17-Jan-23	Introduction to Perceptual Processes	S&P: Ch 1, 2
24-Jan-23	Introduction to Perceptual Processes	S&P: Ch 2, 3
31-Jan-23	Modularity and System Specialization	S&P: Ch 3, 4
7-Feb-23	Perceiving Objects and Scenes	S&P: Ch 5; Hubel & Wiesel, 1962
14-Feb-23	Motor Systems	S&P: Ch 7; EN: Ch 33
21-Feb-23	Visual Systems: Motion, Color, Depth	S&P: Ch 8, 9, 10
28-Feb-23	Auditory Systems: Pitch and Localization	S&P: Ch 11, 12
7-Mar-23	Behavioral Foraging: Echolocation	Coombs et al., 2020; Vance et al., 2021
14-Mar-23	Spring Break	
21-Mar-23	Cutaneous Systems	S&P: Ch 14, EN: Ch 32
28-Mar-23	Chemical Systems: Olfaction & Gustation	S&P: Ch 15; EN: Ch 28, 30
4-Apr-23	Behavioral Foraging: Tactile sensing	EN: Ch 31; Catania, 2021
11-Apr-23	Memory Systems	EN: Ch 15, 26
18-Apr-23	Behavioral Foraging: Learning & Memory	EN: Ch 14
25-Apr-23	Behavioral Foraging: Parental Care	Kohl & Dulac, 2018
2-May-23	Behavioral Foraging: Executive Control	Logue 2014; Diamond, 2013