14 June '23

Shoals Marine Laboratory
Field Animal Behavior
(Cornell: BIOSM 3290 / UNH: MEFB 714)
19 June - 3 July 2023

Course Syllabus and Schedule

Faculty: Dr. Will Kimler, North Carolina State University
Dr. Hal Weeks, Shoals Marine Laboratory
Dr. Steve Nowicki – Duke University (1st week)
Mr. Cameron Barnes B.S. UNH & FAB Alumnus (2nd week)

LT = low tide; L = lecture/discussion; F = field work

19 June, Monday

Afternoon - 1430: Depart Portsmouth on SML Vessel; Arrive on Appledore
L: Island Life & Safety Information; check into dorms

Evening - F: Island Walk and Environmental History
L: Introductions, course philosophy, organization, and goals

20 June, Tuesday (LT @ 0727, 0.1; 1926, 1.3)

Morning - L: Designing Field Studies in Behavioral Ecology (Will)
F: Island walkabout: Larus Ledges, Devil's Dance Floor, heronry
L: Ecological Perspectives and Influences on Behavior (Hal)

Afternoon - F: Gull colony – overview of behavior, life history and distribution
Nancy Lowe, SML Artist in Residence – effective observations as a scientific tool and skill; your journal/field notes
(Worksheet #1 – observations)
L: Animal Sensory Systems (Will)
L: How Animals Experience the World (Steve)

Evening - L: Rock Talk - Dr. Leslie Babonis, Cornell University Dept of Ecology and Evolutionary Biology
Novel Traits and the Creation of Biodiversity (*something like this*)

Assign Predator & Prey Readings (Ellis *et al.* 2012, Lemke & Ryer 2005)

21 June, Wednesday (LT @ 0807, 0.2; 2007, 1.5)

Morning - F: Island walkabout: East Side tidepools
Barnacle size distribution in the intertidal (new)
(Worksheet #2 – pattern observation)
L: Communication (Steve)

Afternoon - L: Territoriality (Will)
Worksheet #3 (hypothesis generation): *due Thursday morning*

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Evening - Post dinner Island Cruise – seals, cormorants, islands)

Time for reading, Worksheet #3 completion

22 June, Thursday (LT @ 0846, 0.4)

Morning - F: Island Walkabout: Finding songbird territories, Crystal Lake – (listen to the island); South Side (Appledore Ledges)
L: How genes and the environment shape behavior (Steve)
F: Songbird territorial behavior – Song Playback Exercise
(Worksheet #4 – data interpretation): *due Sunday before lecture*

Afternoon - L: Predators & Prey – tag-team lecture (Hal, Will)
F: Student time for project concept development, consulting faculty
(Individual or small group field walks)

Evening - Discussion: Ellis *et al*. 2012, Lemke & Ryer 2005 (*bring Reading Response*)
Assign Animal Learning readings (Couvillon et al 2015, Yong 2015, Pashalidou et al 2020, Daley 2020)

23 June, Friday (LT @ 0926, 0.6)

Morning – L: Natural Selection and Evolution (Will)
F: Data Collection with intertidal critters
(Worksheet #5 - data presentation): *due Saturday at lunch*

Afternoon - L: Life Histories and Reproductive Strategies (Hal)

L: Discussion – pros, cons and tradeoffs of living in groups (Hal)

Evening - L: Cetacean Foraging Ecology/whale & seabird watch preparation (Hal)
L: Videos - Animal Learning – Archerfish & Octopus (Hal)
Discussion: Animal Learning (*bring Reading Response*)

24 June, Saturday (LT @ 1008, 0.8)

Morning - L: Orientation and Migration – Considerations of How and Why (Hal)
F: Whale/Seabird Watch (1000 – 1500) on the R/V Gulf Challenger
(Lunch on board)

Afternoon - F: Group-designed Project – hypothesis, design, data collection
Assign Animal Mind reading (Birch, Schnell, & Clayton 2020; Caves, Nowicki, & Johnsen 2019; Salena et al 2021)
F: Project Proposal development – required meeting with Hal and/or Will (bring your journal and ideas)

Evening - L: Evolution of Behavior (Will)
L: Video – Behavior deduced from fossil evidence

25 June, Sunday (LT @ 1050, 0.9)

Morning - good time to read or reflect and/or wander in the field
(Hal, Will & Cam available for consultation, accompanying in field)

Afternoon - L & F: White Island Tern Restoration Project (2 – 3 hr)
F: Your exploration; once again Hal, Will & Cam are available!

L: Group Discussion – Initial Project Ideas & Feedback
Worksheet #6 – Preliminary Project Proposal:
What are your (1) Research Question and Organism, (2) Hypothesis, (3) Predictions, and (4) Proposed Methods to Test the Hypothesis.
Due Monday before lunch

Evening - L: Behavioral Ecology and the Question of Animal Mind (Will)
Discussion: (Birch, Schnell, & Clayton 2020; Caves, Nowicki, & Johnsen 2019, Salena et al. 2021) *(bring Reading Response)*

26 June, Monday (LT @ 1133, 1.1)

Morning - F: Complete Worksheet #6 (Proposal); review your notes and readings

Afternoon - **EXAM**
F: Review your Worksheet #6 question and methods with faculty, and preliminary project work

Evening - Preliminary project planning

27 June, Tuesday (LT @ 1218, 1.2)

Morning - F: Individual Student Projects

Afternoon - F: Individual Student Projects

Evening - L: Rock Talk - Dr. Peter Buston, Boston University Dept of Biology
"Behavioral Ecology & Social Evolution; Population Ecology/Connectivity"

Post-Talk Discussion

28 June, Wednesday (LT @ 1306, 1.3)

Morning - F: Individual Student Projects

Afternoon - F: Individual Student Projects

Evening - L: Group discussion of progress on Project

29 June, Thursday (LT @ 1358, 1.3)

Morning - F: Projects

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Afternoon - L: Tips on writing project reports and giving oral presentations (all)
F: Projects

Evening - Discussion: Career opportunities in the marine sciences
{questionable advice from living case studies}

30 June, Friday (LT @ 1450, 1.1)

Morning - F: Projects

Afternoon - F: Projects

Evening - Prepare oral presentations for Symposium

1 July, Saturday (LT @ 1541, 0.9)

Morning - Almost-Annual FAB Symposium – 32nd edition

Afternoon - Time for writing project reports

Evening - Finish writing project reports

2 July, Sunday (LT @ 1632, 0.6)

Morning - L: *Written Project reports due at BRUNCH*

Post Brunch - Clean-up: Lab & Island field sites (clean your aquaria and get yer plastic outta da field!)
Dorm clean-up

Evening - Farewell Dinner

3 July, Monday

Be packed and at dock by specified times: DO NOT BE LATE
1015 - Departure from Appledore, arrive Portsmouth ~1130

Course Prerequisites: One semester of college level biology or equivalent

Credit hours: 3

Course Objectives/Goals: After successfully completing Field Animal Behavior, students will:

1. Understand the scientific process as applied to field and/or laboratory investigations of behavior. Demonstrate the ability to design, conduct and present an independent investigation.

2. Be able to explain the role of natural selection and the influences of predictable and

unpredictable environmental change in shaping behavioral patterns.

3. Grasp the significance, and be able to provide examples, of quantitative and qualitative measures that illustrate behavioral adaptation.

4. Demonstrate critical thinking in the evaluation of scientific findings.

5. Understand similar selection pressures operate across taxa.

Course Materials:

We will provide access to the assigned Readings in a digital folder:

Ellis, Julie C., Katherine E. Allen, Michelle S. Rome, and Myra J. Shulman. 2012. Choosing among mobile prey species: Why do gulls prefer a rare subtidal crab over a highly abundant intertidal one? *Journal of Experimental Marine Biology and Ecology* 416-417: 84-91.

Lemke, Jena L. and Clifford H. Ryer. 2006. Risk sensitivity in three juvenile (Age-0) flatfish species: Does estuarine dependence promote risk-prone behavior? *Journal of Experimental Marine Biology and Ecology* 333: 172–180.

Couvillon, Margaret J., Hasan Al Toufailia, Thomas M. Butterfield, Felix Schrell, Francis L.W. Ratnieks, and Roger Schürch. 2015. Caffeinated forage tricks honeybees into increasing foraging and recruitment behaviors. *Current Biology* 25: 2815–2818.

Yong, Ed. Caffeine makes for busy bees – not productive ones. 2015. *National Geographic* (October 15).

Pashalidou, Foteini G., Harriet Lambert, Thomas Peybernes, Mark C. Mescher, and Consuelo M. De Moraes. 2020. Bumble bees damage plant leaves and accelerate flower production when pollen is scarce. *Science* 368: 881-884.

Daley, Jim. 2020. Bumblebees bite plants to force them to flower (seriously). *Scientific American* (May 21).

Birch, Jonathan, Alexandra K. Schnell, and Nicola S. Clayton. 2020. Dimensions of animal consciousness. *Trends in Cognitive Sciences* 24 (10): 789-801.

Caves, Eleanor M., Stephen Nowicki, and Sönke Johnsen. 2019. Von Uexküll revisited: Human Biases in the Study of Animal Perception. *Integrative and Comparative Biology* 59 (6): 1451-1462.

Salena, Matthew G., Andy J. Turko, Angad Singh, Avani Pathak, Emily Hughes, Culum Brown, and Sigal Balshine. 2021. Understanding fish cognition: a review and appraisal of current practices. *Animal Cognition* 24: 395–406.

We also have a small collection of scientific papers that provide background information for many of the animals on the island and various concepts in behavioral ecology. They may help you with your project (see below).

This is a short-term field course, so obviously we are not going to cover in detail all concepts in behavior. For more general treatment, and more detail on some of the examples used in lectures, we have three excellent textbooks available for your use in Laighton library:

J. Alcock, 2013, *Animal Behavior - An Evolutionary Approach* (10th ed.)
N. B. Davies, J. R. Krebs, and J. R. West, 2012, *An Introduction to Behavioral Ecology* (4th ed.)
M. Bateson and P. Martin, 2021, *Measuring Behaviour* (4th ed.)

Feel free to consult these books, and others in the library, for help in understanding lecture material, or for assistance in developing ideas regarding your field project. There are earlier editions of these texts that are also quite valuable. However, please do not remove them from the library or class area so that everyone may have ready access to these important resources.

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Assignments & Grading:

Exam:

20% of your grade will be an essay-style, open-note examination halfway through the course. Questions will be taken from lectures, readings and field observations covered to that date, and will require synthesis, integration and critical thinking.

Worksheets:

30% of your grade is based on six Worksheets that will be assigned during the first week of class. These Worksheets are intended to help you understand the methods used by behavioral ecologists to design field studies, and will help you learn how to collect, analyze and report data, and how to make interpretations from your data. The last Worksheet, a formal proposal of your Individual Field Project question and methods, is intended to help you clarify your thoughts toward a simple and direct investigation. The Worksheets should also help you get a feel for the writing and analytical style we expect in your individual project reports.

Individual Field Project:

30% of your grade is based on work related to a field project of your own design and execution. You will select an organism or habitat readily accessible on Appledore Island and thoroughly examine it from behavioral and ecological perspectives. Your project will be evaluated as both a final written report (< 10 pages including tables and figures), and as a 15-minute oral presentation delivered at the end of the course during our Field Animal Behavior Symposium.

We expect everyone to conduct an individual project. However, we will consider two people working together on data collection IF it is clear beforehand that there are distinct questions being investigated and individual reports are prepared. Let us know early if you want to pursue this option.

Personal Involvement:

20% of your grade is based on the faculty's subjective evaluation of your personal involvement in course activities. One part of the assessment is to bring to paper discussion sessions a short, written Reading Response. We expect everyone to participate in lecture and project design discussions, to be an engaged collaborator in the classroom and field, and to demonstrate serious commitment to your field project.

Expectations and Conduct:

Students are responsible for fully understanding all of the information presented in this syllabus. If there are any questions regarding this information, it is the student's responsibility to bring it to the instructor's attention. In addition, students are responsible for attending all activities associated with this course and completing all assignments. Students are responsible for asking questions anytime they need clarification (remember, there is no such thing as a bad question).

If at any time you have questions or comments about the course or life on the island, please feel free to contact one of us directly. We hope you will find Shoals Lab an open and stimulating environment in which to learn about animal behavior and the marine environment, and that you will also find the lab's faculty and staff eager to help facilitate your learning. If you have any problems, suggestions, or see something of interest during your travels around the island, please come and talk with us about it.

Every student is responsible for their own behavior - specifically in being respectful and collegial to other students and with instructors. Students are responsible for fully understanding and adhering to the community standards of behavior.

Academic guidelines and responsibilities include

1. *Personal Technology.* Do not use cell phones in the classroom or during course activities except with permission. If you take notes with your computer, disable wireless access during lecture. We follow a no-cell-phones policy at all meals.
2. Wi-fi is available throughout the island. But do remember that this is a remote site with a population sharing a resource. So please do not download/upload videos or stream content or play games.
3. The lab maintains a modest computer lab in Laighton library. Printers are available, but please limit printing to your FINAL project report. Please bear in mind that this is a shared resource and limit your use to relatively short stints at any one time. At course end, when reports are being prepared, we may need to make use of some type of sign-up.
4. *Transmission of Course Materials*. Students are not authorized to replicate, reproduce, copy or transmit lectures and course materials presented, or derivative materials including class notes, for sale or free distribution to others without written consent of the instructors who are the original source of the materials.
5. *Academic Integrity***.** Any work submitted must be your own. Uncredited use of another person's words, data or images is considered plagiarism, a serious violation of the Code, whether the material comes from another student, a web site, or a published paper. Students must adhere to Cornell's and UNH's Policy for Academic Honesty/Plagiarism and Discrimination
    a. Cornell: https:/theuniversityfaculty.cornell.edu/dean/academic-integrity/code-of-academic-integrity/
    b. UNH: https://catalog.unh.edu/srrr/academic-policies/academic-honesty/

Disabilities & ADA Accommodation: Students with a disability must contact Cornell's (420 CCC building; 607-254-4545) or UNH's Student Disability Services (http://www.unh.edu/disabilityservices) four weeks prior to start of class for confidential discussion of needs and for registration to verify eligibility for academic accommodations. No retroactive accommodations can be made.

Mental Health: Shoals Marine Laboratory cares about you and your well-being. If you experience unusual personal or academic stress during the course or need to talk with someone about a personal problem, seek support from your instructors as soon as possible. In addition, any SML staff is available for consultation 24/7. Find staff in the office in the Hamilton House between 8am – 7pm or knock on the door of Bartell House after hours