Welcome to
BIOL 697 – Individual Study Course:
Principles of Biologging
Course Information and Syllabus
UAF - Spring 2020
2 Credits

Meets Jan 27-April 27 Time: TBD (2h 15min/week) Location: TBD

Professor Cory Williams
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Phone: (907) 474-5965
Office hours: MW 9 - 10 or by appointment in Murie 323C

Prerequisites Graduate Standing and Permission of Instructor

Text There is no textbook. All readings are peer-reviewed research and review articles from the scientific literature and will be provided

Description This course explores how biologging is used to assess the behavioral and physiological responses of free-living vertebrates to the abiotic and biotic environment. The course also explores empirical methods to examine biologging data. This will be accomplished by an exploration of the current primary literature and through exercises using a sample biologging dataset.

Learning 1) Demonstrated knowledge of how physiological and behavioral plasticity contributes to organismal resilience to environmental change
2) Demonstrated knowledge of life-history theory.
3) Gain an understanding on the management and analysis of biologging data using statistical software (R Core and R Studio)
4) Gain an understanding of different biologging approaches used in wildlife biology

Instructional Methods This is an “in-person” course that will utilize discussion-based learning. The student will discuss the primary literature with the instructor and work, with assistance from the instructor, on developing coding skills to import, manipulate, visualize, and analyze large biologging datasets. This course draws heavily upon primary literature and the student will be expected to read 2-3 research/review articles to prepare for class each week. The student will also be required to complete exercises
Grading

Grading will be pass/fail. In order to pass the course, the student will be required to complete all of the assigned readings, pass quizzes on assigned readings (>70% score), and discuss all readings with the instructor. Additionally, the student will have to satisfactorily complete all of the homework exercises (see below).

Quizzes

Five quizzes will be given after discussions; each quiz will consist of 10 questions. If the student receives a score of <70%, they must write a satisfactory synopsis of the paper to be subsequently given a pass on the quiz. Quizzes are designed to promote and reinforce acquisition of core objectives.

Homework

Homework assignments will require the student to develop R code to analyze an example biologging dataset. There will also be in-class opportunities to work with the instructor on the “homework” problems each week. The assignments will teach the student 1) computationally efficient methods for importing, manipulating, and subsampling extremely large datafiles, 2) techniques for visualizing biologging data with a focus on data with a circular structure (circadian behavioral and physiological data), 3) statistical approaches for circadian and circular datasets including periodogram analysis and mixed-model approaches, 4) approaches for behavioral classification of accelerometer data, and 5) criteria used to develop and implement a data management plan, including long-term solutions for data archival.

Discussions

Discussions will cover both theoretical questions being addressed with biologgers, as well as the analytical approaches to tackle those questions. The student must come to class prepared for the discussions.

Missing Class

If the student is going to miss class for a valid reason, they must notify the instructor as soon as possible so that alternative arrangements can be made.

Academic Dishonesty

Acts of academic dishonesty include cheating on quizzes, helping others to cheat, plagiarizing, feigning illness to obtain an extension, and turning in work that was written for another class without permission. Please read the UAF Code of Conduct in the UAF Catalog. Acts of academic dishonesty can result in the student receiving an F for the class and the case will be reported to the Dean of Student's Office for review.

Disabilities

Any student eligible for and needing reasonable accommodations due to a disability is requested to speak with me during the first two weeks of classes. Please contact UAF Disability Services (Phone: 474-5655, TTY x1827; email: uaf-disabilityservices@alaska.edu.) to provide documentation of your disability and to arrange for support services if they are needed.

Student Protections & Services

Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors
have additional protections. As required, if I notice or am informed of certain types of misconduct, then I am required to report it to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/

The lecture/discussion schedule outlined below is tentative and may change. Each week will include a theoretical discussion section and a discussion of analytical approaches (indicated by the Asterix), with the homework assignments focusing on the analytical approach.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Some Key Readings*</th>
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<tbody>
<tr>
<td>1</td>
<td>Welcome &amp; Introduction to Principles of Biologging</td>
<td>Rutz and Hayes 2009</td>
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| 2    | Life-history Theory I  
*Data importation and manipulation | Green et al. 2009 |
| 3    | Life-history Theory II  
*Data Visualization – Plotting | Halsey et al. 2011 |
| 4    | Circadian Rhythms  
*Data Visualization – Actograms I | Geissmann et al. 2019 |
| 5    | Circadian Rhythms  
*Data Visualization – Actograms II | Wang et al. 2015 |
| 6    | Temporal Niche Use  
*Data Analyses – Periodigrams | Ruf et al. 1999 |
| 7    | Temporal Niche Shifts  
*Data Analyses – Circular Stats | |
| 8    | Energetics and Biologging I  
*Data Analyses IV – Mixed Models I | Ruf and Geiser 2014 |

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| e9   | Energetics and Biologging II  
*Data Analyses – Mixed Models II | |
| 10   | Animal Behavior I  
*Data Analyses – Mixed Models III | Brown et al. 2013 |
| 11   | Animal Behavior II  
*Data Analyses – Behavioral Classification I | |
| 12   | Behavioral Classification I  
*Data Analyses – Behavioral Classification II | McClune et al. 2014 |
| 13   | Behavioral Classification II  
*Data Analyses – Behavioral Classification III | |

*These are example readings. 2-3 Readings will be provided per week.
Example Readings:


