

Course Introduction

Michael Noonan

Biol 417: Evolutionary Ecology



1. Course Overview

Course Overview

Name: Michael Noonan

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Office Hours: Mon 14h00-15h00; or by appointment arranged via email.

Course Website: <https://noonanm.github.io/Biol417/index.html>

All lectures can be attended in-person, or over zoom.

If you choose to attend via zoom, there is always a risk of technical failures, and I may miss your question.

All lectures will be recorded and posted online, in the event of any technical failures, lectures from a previous year will be posted.



frontiers
in Ecology and Evolution

ORIGINAL RESEARCH
published: 12 October 2015
doi: 10.3389/fecv.2015.00116



Evolution and function of fossoriality in the Carnivora: implications for group-living

Michael J. Noonan, Chris Newman, Christine D. Buesching and David W. Macdonald*

Wildlife Conservation Research Unit, Department of Zoology, The Natural History Museum, University of Oxford, UK

Received: 22 July 2016 | Revised: 17 August 2016 | Accepted: 18 August 2016
DOI: 10.1002/ecv.3480

ORIGINAL RESEARCH

WILEY Ecology and Evolution

Sexual size dimorphism in musteloids: An anomalous allometric pattern is explained by feeding ecology

Michael J. Noonan¹ | Paul J. Johnson¹ | Andrew C. Kitchener^{2,3} |
Lauren A. Harrington¹ | Chris Newman¹ | David W. Macdonald¹

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Research



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Rensching cats and dogs: feeding ecology and fecundity trends explain variation in the allometry of sexual size dimorphism

P. J. Johnson¹, M. J. Noonan^{1,2}, A. C. Kitchener^{3,4},
L. A. Harrington¹, C. Newman¹ and D. W. Macdonald¹

Received: 21 May 2021 | Accepted: 27 October 2021
DOI: 10.1111/2041-210X.12763

RESEARCH ARTICLE

Methods in Ecology and Evolution

A semi-variance approach to visualising phylogenetic autocorrelation

Michael J. Noonan¹ | William F. Fagan² | Christen H. Fleming^{2,3}

- Focus is on the ecological basis for the evolution of life histories.
- We will explore how the way that organisms interact with the environment and community they live in can shape evolutionary trajectories in rich, interconnected ways.
- We will also explore how plants and animals can shape the environment they live in, resulting in complex dynamics that unfold over evolutionary timescales.
- We will learn about the tools that ecologists use to study evolutionary processes.
- We will put evolutionary ecology into the context of current human induced environmental change.

- Genetics (you should be familiar with basic concepts of genetics, including Mendelian inheritance, mutations, genetic drift, etc.)
- Evolution (we will not be focusing on evolution *per se*).
- Ecology (you should have a working knowledge of ecological concepts, population and community ecology, etc.).
- Palaeoecology. We will not be focusing much on fossil plants and animals.
- Basic statistics (concepts like means, medians, variances, probability distributions, regression should be familiar to you).

Paper Summaries (6 of 8)	30%	Due on ~weekly basis
Essays (3)	48%	Every ~3 weeks
Research proposal	22%	Week 14
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Total	100%	

Beginning in week 2 you will be asked to write 1-page summaries of research papers that focuses on an area of evolutionary ecology.

Papers will be assigned by me and provided to you in advance.

The following points should be covered:

1. What is/are the issue(s) addressed by the paper?
2. What is the underlying research approach taken by the paper?
3. What are the main results and what conclusions are expected to be drawn from the paper?
4. How much confidence in the obtained results are implied by the author(s)?
5. Is this confidence justified in your opinion?

Grading: Each will be marked on composition, comprehension, clarity, and coverage of points 1-5, and will be worth 5% of your final grade.

You will be asked to complete three written essay assignments throughout the course.

For each of these essays, you will be given a topic or question. You will then be expected to write an essay addressing the topic or question.

The essays should be a *minimum* of five pages in length (double spaced using a 12-point font).

Include references to all necessary literature in a format of your choosing. References must be included, but do not count towards the total length.

Grading: Each essay will be graded out of 100, and will be worth 16% of your final grade.

If you haven't written many essays before, you're encouraged to read the following resources:

<https://www.oxbridgeessays.com/blog/how-to-structure-an-essay/>

<https://www.scribbr.com/category/academic-essay/>

<https://www.grammarly.com/blog/essay-writing/>

Students will work in groups (minimum 2 maximum 4) to prepare a research proposal that outlines a plan to address a research question that would advance the field of evolutionary ecology.

Proposals have a *maximum* length of 10 pages, comprised of:

1. **Introduction.** Explain the big picture question, what work has been done to date, and why you have chosen a particular system.
2. **Objectives.** Outline of the key objective(s) of the proposed research.
3. **Team.** Describe the research team and how each person's strengths will contribute to achieving the research goal.
4. **Methods.** Describe the experimental and data collection protocols.
5. **Significance.** Describe the significance to the field of evol. ecol.
6. **Project timeline.** A visual depiction of the project timeline.
7. **References.** Include references to all necessary literature.

You will also have to prepare a budget (maximum: \$500,000 CAD).

The budget should be prepared using a pre-provided spreadsheet, and include (but is not limited to):

1. The cost of personnel.
2. The cost of equipment.
3. The cost of publishing manuscripts.
4. Conference and fieldwork travel to collect data and share findings.
5. University overhead (the university will take 25% of your total budget as overhead to cover operational costs).

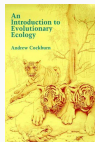
Grading: The proposals will be graded out of 100 and will be worth a total of 22% of your final grade.

Late assignments will have 5% deducted per day that they are overdue and will receive a grade of zero if more than 20 days late without a valid reason.

Everyone can submit **1** assignment late without penalty.

There is no textbook for this course, but, if you are interested, the following are recommended:

- Stearns, S. C., & Hoekstra, R. F. (2000). *Evolution, an introduction*. Oxford University Press. ~ \$20 on Amazon, or through UBC libraries.
- Cockburn, A. (1991). *An introduction to evolutionary ecology*. Wiley-Blackwell. ISBN 0632027290. ~ \$20 used on Amazon, or through UBC libraries.
- Pianka, E. R. (1999). *Evolutionary ecology*. Benjamin Cummings. ISBN 0321042883. ~ \$170 on Amazon (\$20 for used), or through UBC libraries.



Week Lecture Topics

- 1 Course intro; Scope of Evol. Ecol; Selection and Adaptation
- 2 Studying Evol. Ecol.: Experimentation; Comparative Methods; Models
- 3 Meteorology; The Habitat Template; Biogeography
- 4 The Ecological Niche; Competition; Specialists vs. Generalists
- 5 Specialising on Environmental Change: Migration, Dormancy, Energetics
- 6 Burrowing, Correlative Effects; Stochasticity and Space Use
- 7 The Ecology of Sex: Costs and Benefits; Males and Females
- 8 The Ecology of Sex: Sex Ratios; Sexual Selection, Mating Systems
- 9 Inclusive fitness & sociality
- 10 Information; signaling; learning Metabolic theory of ecology
- 11 Biodiversity and community stability
- 12 Evolution and Human Induced Rapid Environmental Change (HIREC)
- 13 Scope of evolutionary ecology revisited