

Ornithology BIOL & ESP 437 and 537

Spring 2022

Professor: Dr. Luther
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Email: dluther@gmu.edu
Office Hours: anytime Mon – Thurs 10am to 3pm by email and zoom

Laboratory Instructor: Mr Shawn Smith
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Lecture: Friday 1:30-4:10 Angel Cabrera Global Center 1302A

Lab: Friday 9:00-11:45 EXPL L509

However, for the laboratory section we will go on field trips and meet at the site of the field trip. Directions to the locations will be emailed earlier in the week. See syllabus for tentative locations.

I. COURSE AIM AND OBJECTIVES

LECTURE Students will learn the basic principles of ornithology and how they relate to the disciplines of ecology, behavior, evolution, physiology, and conservation biology. In addition, students will read and report on scientific studies in the primary literature for a greater understanding of the scientific research on birds, data analysis, hypothesis testing, and the scientific process.

Dr. Luther will employ a flipped class design for the lectures. For the flipped design Dr. Luther will post a prerecorded lecture at the beginning of each week that students should observe and take notes prior to the class meeting on Friday. During the lecture portion of the class, on Friday afternoons, he will discuss the lecture content and answer questions about the video lectures in addition to active learning activities with students. Students are expected to attend the lecture each week to earn class participation points as well as ask questions from the lectures, and participate in active learning activities to better familiarize themselves with the material from the weekly lectures and that will be on the exams.

LAB Students will be taught how to identify birds by sight and sound, with an emphasis on birds of the eastern United States. Students will also be exposed to field skills that are used to quantify avian richness, abundance, behavior and population density, as well as experimental design for testing hypotheses related to avian life history traits.

II. COURSE CONTENT

Ornithology BIO 537 will focus on the ecology, evolution, physiology, behavior and conservation of birds. The laboratory section of the course will focus on the identification and behavior of birds in Northern Virginia, and will reinforce ecological, behavioral, and evolutionary theories discussed in the lecture. We will meet Friday mornings for laboratory exercises that include bird watching field trips and focus on bird identification and avian ecology.

III. COURSE MATERIALS

There is no assigned textbook for the lecture portion of the course. Instead we will be reading articles from the primary literature. PDFs of the articles will be posted on blackboard for you to read. You are expected to read all assigned material and hand in associated homework before attending class.

For the laboratory portion of the course you are required to buy your own field guide for the lab (I recommend National Geographic or Peterson Birds of North America).

**National Geographic Field Guide to the Birds of North America, 7th Edition
Paperback – Illustrated, September 12, 2017**

Or

Peterson Field Guide To Birds Of North America, Second Edition (Peterson Field Guides) Hardcover – Illustrated, April 7, 2020

Or

Peterson Field Guide To Birds Of Eastern & Central North America, Seventh Ed. (Peterson Field Guides) Illustrated, October 2020

IV. GRADING PROCEDURES AND ASSIGNMENTS

Grades

150pts weekly homework (15pts each)

50pts classroom participation

100pts final exam

110pts laboratory assignments (10pts each)

50pts laboratory final exam

460 Total Points Undergraduate Students

Grade Breakdown for undergraduate students

POINTS	PERCENT	GRADES
414-460	90- 100%	A
404-413	88- 89%	B+
368-403	80-87%	B
358-368	78-79%	C+
320-357	70-77%	C
276-319	60-69%	D
0- 275	0-59%	F

Homework: Each week write a summary of one of the assigned articles. Homework will be submitted via blackboard.

Summarize the assigned paper. The summary should include a description of the following information:

- The hypothesis (or hypotheses) tested,
- Essential concepts in the paper,
- Methods used to test the hypotheses,
- Results of the study/ major findings.

In addition, include your own thoughts about the paper. For example:

- What are the big picture implications of the study?
- Were the methods appropriate for testing the stated hypothesis?
- Would you have done it differently or the same?
- What could be done to improve the study?

Class Participation:

Class participation will be graded as a combination of attending class, participating in class with questions and comments, and participating online in weekly discussion board questions.

For week 1, post your name, why interests you about this class, and what you hope to learn from this class, and potentially use later in life. Each week, starting in week 2 of the semester, you will be assigned 2 papers to read, post 1 question about each paper in this discussion forum and label the question based on the week of the semester, i.e. week 1, week 2, etc. In addition, respond to at least one other students question.

Written paper (Graduate Students Only):

For the written paper you will select one of the research questions, see word doc on blackboard, and develop hypotheses and predictions for the selected question. You will write a paper based on what you find in the literature to support or refute your hypotheses and predictions. The paper should be 6 pages double spaced, 1 inch margins, with at least 10 references (none of which are websites). The paper will be due on April 22nd. No extensions will be accepted.

Laboratory assignments:

The laboratory assignments and grade will be comprised weekly notes on behavior and identification of species observed during the laboratory field trips and the laboratory final exam, which will be a field test of bird identification by sight and sound.

Labs:

Dress appropriately for walking outdoors. Be ready for cold and/or wet weather in the winter and mosquitoes in the spring. It is easier to stay warm than get warm so bring extra clothes and take some off rather than not bringing enough clothes. Since the DC region has so many ticks and many of them seem to have Lyme's Disease, after each lab you should check yourself for ticks and tick bites. It is also wise to bring something to drink and a snack.

V. FACULTY EXPECTATIONS/COURSE POLICIES

HONOR CODE: The Biology Department strongly enforces the GMU Honor Code. Students are expected to read and adhere to the George Mason University Honor Code. **Ignorance of the Honor Code is no excuse for infractions thereof.** All work done in lecture and lab (exams, data sheets, quizzes, etc.) must be the sole work of the student. Copying data, falsifying data, cheating on exams and quizzes, failing to credit the work of others are all violations of the Honor Code and will be dealt with most seriously.

Course Expectations: Because our class activities are dependent on the readings, each student is expected to read the materials BEFORE the topic is discussed in class. In addition, you will often be expected to participate in class group discussions.

Assignments: All assignments are due at the *beginning* of class on the date they are due. ***A late penalty of 10% will be assessed for every day past due.***

Campus Resources

OFFICE OF DISABILITY SERVICES: If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at (703) 993-2474. All academic accommodations must be arranged through the ODS. <http://ods.gmu.edu>

WRITING CENTER: A114 Robinson Hall; (703) 993-1200 or Prince William Campus (703) 993-8451; <http://writingcenter.gmu.edu>

UNIVERSITY LIBRARIES "Ask a Librarian"
<http://library.gmu.edu/mudge/IM/IMRef.html>

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): (703) 993-2380;
<http://caps.gmu.edu>

UNIVERSITY POLICIES: The University Catalog, <http://catalog.gmu.edu>, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at <http://universitypolicy.gmu.edu/>. All members of the university community are responsible for knowing and following established policies.

Class Schedule Spring 2022

*(All lab field trip locations are tentative
and may change the week of the lab.)*

Guest lectures are also subject to change)

Date:	Lecture Topic	Reading (due prior to class)	Laboratory
Jan 28	Introduction, avian diversity, and biogeography		Introduction, birds on GMU campus
Feb 4	Bird orders families and species of the world	Jetz, W., Thomas, G. H., Joy, J. B., Hartmann, K., & Mooers, A. O. (2012). The global diversity of birds in space and time. <i>Nature</i> , 491(7424), 444-448. McCain, C. M. (2009). Global analysis of bird elevational diversity. <i>Global Ecology and Biogeography</i> , 18(3), 346-360.	Occoquan NWR, Woodbridge https://www.fws.gov/refuge/occoquan_bay/
Feb 11	Adaptations for flight and feather structure	McKellar et al. 2011. A diverse assemblage of Late Cretaceous Dinosaur. And bird feathers from Canadian Amber. <i>Science</i> . 333. 1619-1622. Gvozdkova et al. 2019. Plumage iridescence is associated with distinct feather microbiota in a tropical passerine. <i>Scientific Reports</i> . 9:12921	Huntley Meadows, Alexandria https://www.fairfaxcounty.gov/parks/huntley-meadows
Feb 18	Species, speciation, and systematics	Naka, L. N., & Brumfield, R. T. (2018). The dual role of Amazonian rivers in the generation and maintenance of avian diversity. <i>Science advances</i> , 4(8), eaar8575. Claramunt, S., Derryberry, E. P., Remsen Jr, J. V., & Brumfield, R. T. (2012). High dispersal ability inhibits speciation in a continental radiation of passerine birds. <i>Proceedings of the Royal Society B: Biological Sciences</i> , 279(1733), 1567-1574.	Blandy Farms, VA state arboretum https://blandy.virginia.edu/
Feb 25	Form, function, and physiology	Provinciato, I. C. C., Araújo, M. S., & Jahn, A. E. (2018). Drivers of wing shape in a widespread Neotropical bird: A dual role of sex-specific and migration-related functions. <i>Evolutionary Ecology</i> , 32(4), 379-393. Pigot, A. L., Sheard, C., Miller, E. T., Bregman, T. P., Freeman, B. G., Roll, U., ... & Tobias, J. A. (2020). Macroevolutionary convergence connects morphological form to ecological function in birds. <i>Nature Ecology & Evolution</i> , 4(2), 230-239.	Dyke marsh, Alexandria https://www.nps.gov/gwmp/planyourvisit/dykemarsh.htm
Mar 4	Reproduction, nesting, and the egg	Visser et al. 2009. Temperature has a causal effect on the timing of reproduction. <i>Proc B</i> 276 2323-2331 Rockwell et al. 2012. Carry-over effects of winter climate on spring arrival date and reproductive. Success in an endangered migratory. Bird, Kirtland's warbler. <i>Auk</i> 129:752-752	Occoquan NWR, Woodbridge https://www.fws.gov/refuge/occoquan_bay/
Mar 11	Bird senses, brains, and intelligence	Emery et al. 2004. The mentality of crows; convergent evolution of intelligence in corvids and apes. <i>Science</i> 306 1903-1907 Dominoni, D. et al. 2020. Why conservation biology can benefit from sensory ecology. <i>Nature Ecology & Evolution</i> , 4(4), 502-511.	Burke Lake Park, Burke https://www.fairfaxcounty.gov/parks/burke-lake
Mar 18	Spring break no class		Spring break no class
Mar 25	Vocalizations and communication	Moseley, D. L., Derryberry, G. E., Phillips, J. N., Danner, J. E., Danner, R. M., Luther, D. A., & Derryberry, E. P. (2018). Acoustic adaptation to city noise through vocal learning by a songbird. <i>Proceedings of the Royal Society B</i> , 285(1888), 20181356.	Manassas Battlefield NHP https://www.nps.gov/mana/index.htm

		Riebel, K., Odom, K. J., Langmore, N. E., & Hall, M. L. (2019). New insights from female bird song: towards an integrated approach to studying male and female communication roles. <i>Biology Letters</i> , 15(4), 20190059.	
Apr 1	Annual cycles; molt, migration, and navigation	Briedas et al. 2019. A full annual perspective on sex-biased migration timing in long-distance migratory birds. <i>Proc B.</i> 286:20182821. Wolfe, J. D., Terrill, R. S., Johnson, E. I., Powell, L. L., & Brandt Ryder, T. (2021). Ecological and evolutionary significance of molt in lowland Neotropical landbirds. <i>The Auk</i> , 138(1), ukaa073.	Sky meadows state park https://www.dcr.virginia.gov/state-parks/sky-meadows
Apr 8	Life History; reproductive success	Tarwater et al. 2011. Pre-reproductive survival in a tropical bird and its implications for avian life histories. <i>Ecology</i> . 92:1271-1281.	GMU avian territory mapping activity
Apr 15	Populations, species, and communities	Hendershot et al. 2020. Intensive farming drives long-term shifts in avian community composition. <i>Nature</i> . 597:393-402 Riddell et al. 2021. Exposure to climate change drives stability or collapse of desert mammal and bird communities. <i>Science</i> 371:633-636.	GMU avian territory mapping activity
Apr 22	Social behavior, mates, and breeding systems	Downing et al. Group formation and the evolutionary pathway to complex sociality in birds. <i>Nature Ecology and Evolution</i> Macedo et al. 2018. Breeding clusters in birds: ecological selective contexts, mating systems and the role of extrapair fertilizations. 1:1-10.	Leesylvania State Park https://www.dcr.virginia.gov/state-parks/leesylvania
Apr 29	Conservation, threats to birds	Harfoot, M. B., Johnston, A., Balmford, A., Burgess, N. D., Butchart, S. H., Dias, M. P., ... & Geldmann, J. (2021). Using the IUCN Red List to map threats to terrestrial vertebrates at global scale. <i>Nature Ecology & Evolution</i> , 5(11), 1510-1519. Bateman, B. L., Taylor, L., Wilsey, C., Wu, J., LeBaron, G. S., & Langham, G. (2020). Risk to North American birds from climate change-related threats. <i>Conservation Science and Practice</i> , 2(8), e243.	Occoquan NWR, Woodbridge https://www.fws.gov/refuge/occoquan-bay/
May 6	Conservation actions	Luther, D. A., Brooks, T. M., Butchart, S. H., Hayward, M. W., Kester, M. E., Lamoreux, J., & Upgren, A. (2016). Determinants of bird conservation-action implementation and associated population trends of threatened species. <i>Conservation Biology</i> , 30(6), 1338-1346. Ainsworth, G. B., Fitzsimons, J. A., Weston, M. A., & Garnett, S. T. (2018). The culture of bird conservation: Australian stakeholder values regarding iconic, flagship and rare birds. <i>Biodiversity and conservation</i> , 27(2), 345-363.	Laboratory Final Exam Location TBA

Lecture Final Exam: May 13 2022 from 1:30 – 4:15PM