NEUR 405 – Animal Behavior
Spring 2026 (3 credits)

Instructor: Dr. L. Ren Guerriero (they/them)
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Their phone #: 703-993-5901
Meeting times: Friday 10:30 am – 1:10 pm
Meeting location: Krasnow 229
Office Hours: TBD
Office Location: Krasnow 253 and Zoom

What is this class?

This class will get you in the lab and start with your own independent research project. Working in groups, students will investigate their own novel sleep-related gene in the fruit fly, *Drosophila melanogaster.* This will include weekly class meetings to learn new lab techniques and discuss literature, and also out-of-class research time to work with flies and gather new data. The class will culminate with a poster presentation describing your new findings.

What will I get out of this class?

Learning Outcomes:

(1) Design a research project from experimental design, data collection, and analysis to investigate your gene of interest.
(2) Care for *Drosophila* and set up crosses for genetic manipulation.
(3) Gain a behavioral and genetic understanding of sleep and circadian rhythms.
(4) Learn to analyze a variety of *Drosophila* behaviors (sleep, activity, climbing).
(5) Communicate data and conclusions in a research poster.
(6) Transfer techniques learned to other organisms and research projects.

How do I do well in this class?

This class requires you to be responsible for your own research project investigating newly identified sleep-related gene. You will start with generating a hypothesis, gather data, run the statistics, and communicate your findings. You will work with your classmates in small groups to divide the workload. This will require a lot of time coming into the lab to maintain stocks, set up crosses, and run sleep experiments. Assigned readings are given to help you learn fly care and important background information, and homework is all designed to help you produce.

To do well you need to do your readings before coming to class and be ready to discuss. I recommend taking notes when reading and coming prepared for discussion. Also, communication is key to doing well in this course. You will be graded on your written and oral communication, but communication is necessary when you are confused in class.

To make sure we all know how to act in class, our first day we will write and vote on a code of conduct, which will then be added to the syllabus. This will include both instructor and student responsibilities. It is then our job to uphold ourselves and others to the code of conduct.

What materials do I need for this class?

Each student will keep notes and compile data in their very own lab notebook. This is a tool that you will always use in research. Before class on week 2, you need to bring a lab notebook; this

notebook needs to have ruled pages (grid is okay) that cannot be easily removed from the book (book bound, not spiral bound OR the pages are already numbered). This can be a simple composition notebook (~$1 at Walmart) to more fancy notebooks with carbon copies (~$19 at GMU Bookstore). You will need to write in this notebook using PEN (not pencil) and on only one side of the page. Reserve the first 2 pages for the table of contents.

What are our responsibilities? (Code of Conduct)
These will be written and voted on in our first meeting of the class.

Student responsibilities:

- The Family Educational Rights and Privacy Act (FERPA) governs the disclosure of education records for eligible students and is an essential aspect of any course. **Students must use their GMU email account** to receive important University information, including communications related to this class. Instructors will not respond to messages sent from or send messages regarding course content to a non-GMU email address.
- Academic Standards exist to promote authentic scholarship, support the institution's goal of maintaining high standards of academic excellence, and encourage continued ethical behavior of faculty and students to cultivate an educational community which values integrity and produces graduates who carry this commitment forward into professional practice.
    - As members of the George Mason University community, we are committed to fostering an environment of trust, respect, and scholarly excellence. Our academic standards are the foundation of this commitment, guiding our behavior and interactions within this academic community. The practices for implementing these standards adapt to modern practices, disciplinary contexts, and technological advancements. Our standards are embodied in our courses, policies, and scholarship, and are upheld in the following principles:
        - **Honesty**: Providing accurate information in all academic endeavors, including communications, assignments, and examinations.
        - **Acknowledgement**: Giving proper credit for all contributions to one's work. This involves the use of accurate citations and references for any ideas, words, or materials created by others in the style appropriate to the discipline. It also includes acknowledging shared authorship in group projects, co-authored pieces, and project reports.
        - **Uniqueness of Work**: Ensuring that all submitted work is the result of one's own effort and is original, including free from self-plagiarism. This principle extends to written assignments, code, presentations, exams, and all other forms of academic work.
    - Violations of these standards—including but not limited to plagiarism, fabrication, and cheating—are taken seriously and will be addressed in accordance with university policies. The process for reporting, investigating, and adjudicating violations is outlined in the university's academic standards procedures. Consequences of violations may include academic sanctions, disciplinary actions, and other measures necessary to uphold the integrity of our academic community.

Instructor responsibilities:

- COVID Policies: All students, instructors, and TAs are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (https://www2.gmu.edu/safe-return-campus). Similarly, all students, instructors, and TAs in face-to-face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. Only students, instructors, and TAs who receive a "green" notification are permitted to attend courses with a face-to-face component. If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and are thereby permitted to be in class.

- As a part of George Mason University's commitment to providing a safe and non-discriminatory learning, living, and working environment for all members of the University community, the University does not discriminate on the basis of sex or gender in any of its education or employment programs and activities. Accordingly, **all non-confidential employees, including your faculty member, have a legal requirement to report to the Title IX Coordinator, all relevant details obtained directly or indirectly about any incident of Prohibited Conduct** (such as sexual harassment, sexual assault, gender-based stalking, dating/domestic violence). Upon notifying the Title IX Coordinator of possible Prohibited Conduct, the Title IX Coordinator will assess the report and determine if outreach is required. If outreach is required, the individual the report is about (the "Complainant") will receive a communication, likely in the form of an email, offering that person the option to meet with a representative of the Title IX office.

    - For more information about non-confidential employees, resources, and Prohibited Conduct, please see University Policy 1202: Sexual and Gender-Based Misconduct and Other Forms of Interpersonal Violence. Questions regarding Title IX can be directed to the Title IX Coordinator via email to TitleIX@gmu.edu, by phone at 703-993-8730, or in person on the Fairfax campus in Aquia 373.

How will I be graded in this class?

Grading Scale:

A+ 97-100%	B+ 87-89%	C+ 77-79%	D 60-69%	F 0-59%
A 93-96%	B 83-86%	C 73-76%		
A- 90-92%	B- 80-82%	C- 70-72%		

Assignments (90 points, 9 x 10 points) – Weekly reading assignments two sentence summaries. One sentence on something new and interesting that you read, and other sentence on something that you have a question about. Other weeks you will be assigned worksheets about your specific gene or readings.

Participation (70, 14 x 5 points/day) – Attending class is essential for this research-based course. You will learn new techniques that will be used that week with your flies and you will go over

reading and other assignments. Participation also includes coming to your agreed upon lab times outside of our class meeting. This is when you will collect data and be working with your flies. Not coming to class or to work in the lab will put your research project behind and you will not have a completed project for your poster showcase.

Lab Notebook (40 points) - Everything that you do for your research project needs to be written down in your lab notebook. (See above for notebook specifications) This is a complete log of your work on the project that can be read by future researchers working on this project. Your notes must be neat and able to be read by others (this includes defining all your abbreviations). Notebooks must be filled out in pen (to prevent erasing of data) and any mistakes should just have a single line to cross them out. Further instructions will be given during the first class meeting.

Poster Presentation (100 points) – At the end of the semester, each group will present a poster on their findings. This will include an abstract, introduction, methods, results, conclusions, and future work. To make this poster, data will be statistically analyzed and conclusions will be drawn from the data you collected.

I missed class or an assignment, what do I do?

Life is unpredictable and illness (both physical and mental) should be taken seriously. If you know you will not be in class, email Dr. Guerriero. Holidays, illnesses, and university sanctioned events likely count as an excused absence, but only if you notify Dr. Guerriero either before the event or as soon as you decide you're too ill to come to class. If you miss your out of class lab time, you MUST NOTIFY YOUR GROUP MEMBERS and try to get them to cover your work.

I'm struggling in this class. How do I get help?

I don't understand the class material, assignments, my grades – email Dr. Guerriero. When emailing us, you have to use your gmu.edu email account or we cannot verify that the email came directly from you.

I'm stressed, anxious, angry, or mentally unwell – Counseling and Psychological Services have drop-in hours or virtual services, including a text line, online chat, and video chats. If its outside business hours, they have an after-hours crisis counselor (call 703-993-2380 and selection option 1).

I need help with time management, note taking, or other study skills – Talk to Dr. Guerriero or reach out to Learning Services for a personalized appointment and online tools.

I'm struggling with social issues that impact my identity, my culture, or me personally – College and higher education is inherently exclusionary, racist, sexist, and classist, and I'm committed to helping change that. Mason is also committed to this, with lots of resources:

- Center for Culture, Equity, and Empowerment (includes bias incident reporting form)
- First-Gen+ Center (resources for first-generation, undocumented, refugee, and limited income students)
- LGBTQ+ Resources Center (including crisis, community, and gender transition resources)
- Student Support and Advocacy Center (resources for financial help, sexual and interpersonal violence support, and drug/eating disorder recovery)

I need class accommodations for a disability, illness, or other reason – First talk to Disability Services office. They will meet with you virtually and help you with your individual needs.

We can only activate your accommodations after you talk with Disability Services. Then talk to Dr. Guerriero about this class; they are happy to help you with what you need.

Tentative Schedule – Spring 2026

Subject to change (check Blackboard for the most recent version)

Assumptions: Meeting once a week for lab meeting
Students work outside the lab on their own projects

Week	Class Content	Lab Techniques	Homework Due Before Class
1 Jan 23	Introduction to *Drosophila* Introduction to the project	Lab Notebook, Fly Lifecycle, Flipping Flies, Sex Determination	Reading: Syllabus, Blackboard Assignment: Lab Safety Training, Acquire lab notebook
2 Jan 30	Reading Fly Genotypes, Measuring activity and sleep in flies	Introduction to DAM2 Monitors, Commonly used genetic markers (curly, stubble, tubby) Determining virgins	Reading: Drosophila Workers Unite – Ch 1-4 Assignment: DWU Ch 1 – 4 worksheet – Due Feb 1
3 Feb 6	Genetics refresher, Homolog search using mouse genes to find fly genes	Setting up crosses, Loading control flies in sleep monitors, FlyBase gene search, BLAST	
4 Feb 13	IMPC introduction Designing research hypotheses	Load progeny in monitors, Our genetic mutants, GAL4-UAS system	Reading: Joshi *et al.,* 2019. Noninvasive sleep monitoring in large-scale screening of knock-out mice reveals novel sleep-related genes (Part 1) Assignment: 2 sentence summary
5 Feb 20	Manipulating genes in model organisms (GAL4-UAS, Cre-lox, CRISPR)	Gather Data, Load flies as needed, Introduction to IMPC database	Reading: Joshi *et al.,* 2019. Noninvasive sleep monitoring in large-scale screening of knock-out mice reveals novel sleep-related genes (Part 2) Assignment: 2 sentence summary
6 Feb 27	What is sleep and what don't we know about it? Limitations to the DAM2 monitors	Load flies as needed, Mouse phenotypes of homolog knockouts	Reading: Drosophila Workers Unite – Ch 5, 6, 8 Assignment: 2 sentence summary
7 Mar 6	New poster design, Designing statistical hypotheses, Introduction to Data analysis	Load flies as needed What makes a good poster?	Reading: Shaw *et al.,* 2000. Correlates of Sleep and Waking in *Drosophila melanogaster* (abbreviated) Assignment: 2 sentence summary
8 Mar 13	Spring Break – Get some sleep		
9 Mar 20	Sleep and wake in flies (neuroanatomy), More data analysis	Load flies as needed	
10 Mar 27	More data analysis	Finish sleep recordings, Analyze data	Reading: Kayser and Biron, 2016. Sleep and Development

			in Genetically Tractable Model Organisms Assignment: Kayser and Biron 2016 Worksheet
11 Apr 3	Written scientific communication	Work on poster, Analyze data, Statistics	Reading: Assignment: Turn in poster introduction and abstract
12 Apr 10	Statistical analysis of activity and sleep data	Analyze data, Statistics	Reading: Assignment: Work on poster
13 Apr 17	Building conclusions and putting our findings in perspective Expanding our findings to mammals and human		Reading: none Assignment: Poster rough draft due
14 Apr 24	Poster Practice Talks	Finish poster	Reading: none Assignment: Final poster version
15 May 1	No class		