

**Animal Models of Neurodegenerative Disease Lab BIO422LS/NEURO388LS
FALL 2021 Syllabus**

Primary Goals:

- 1) To compare the cellular and molecular mechanisms of human neurodegenerative disorders in scientific literature. (Seminar)
- 2) To use the animal model, *Drosophila melanogaster*, to analyze Hereditary Spastic Paraplegia and the homologous mutated gene, *spastin*. (Lab)
- 3) To test novel reagents for generating *spastin* gene deletions using the CRISPR / Cas9 system. (Lab)
- 4) To communicate original research results to the broader scientific community through written Figures and through oral presentation of a scientific poster.

Drosophila melanogaster model of Hereditary Spastic Paraplegia

- How do *spastin* point mutations and deletions affect the...
 - a. morphology of the neuromuscular junction
 - b. viability of the animal throughout development
 - c. locomotor ability of the animal
 - d. longevity of the animal
- Can we induce deletions of *spastin* with CRISPR/Cas9 in *Drosophila melanogaster*?
- Can tissue-specific *spastin* deletions identify cell types in which *spastin* is required?

Class Times and Location:

<i>Seminar:</i>	Mon	3:30pm-4:45pm	
<i>Lab:</i>	Tues / Thurs	10:15am-12:45pm	BioSci 0035

Instructors:

Nina Sherwood	Emily Ozdowski
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Office hours are arranged by email, Slack, or Sakai sign-up and may be in-person or over Zoom.

Textbook / Materials Needed:

- There is no textbook for this course, as we will be reading journal articles primarily.
- Software
 1. **Microsoft OneNote:** We will keep digital records, rather than recording the details of your experiments in a paper lab notebook. An invitation from SharePoint should arrive in your email.
 2. **Adobe Creative Cloud:** An Adobe Creative Cloud account will be necessary for signing into Photoshop on the lab computers (Duke OIT provides this to all students - <https://oit.duke.edu/category/software>). You are welcome to download Photoshop on your personal computer, but it is not essential.
 3. **DNA Lasergene:** This sequence analysis software is installed on the brand new lab computers (which have the horsepower to run it).

Grading Policy

Participation: 10%

In-person attendance during the seminar and lab periods is mandatory, as the majority of data collection will be completed during this time. Active and careful participation in animal husbandry, microscopy, dissection of live animals, handling of hazardous materials, calculating digital measurements, data analysis, data storage, and lab cleanup are essential. Professionalism with lab partners is expected. Safety precautions with regard to COVID-19 prevention (wearing masks, sanitizing stations) are required.

Seminar Assignments and Discussion: 20%

Read the weekly assigned literature and complete the associated questions before class. Discuss the published experimental approaches, the authors' conclusions, and what we learn about various neurodegenerative and movement disorders. Seminar will primarily function as a journal club, and secondarily as a lab meeting for oral presentation of group results.

Post-lab Assignments and Lab Notebook: 20%

Each lab session will require dated documentation, such as design of genetic crosses or a log of experimental results. These assignments will be graded on demonstrated knowledge of the background material as well as completion of the experimental methods.

Figures and Figure Legends: 30%

This course is designed to exemplify real-world lab experience and the generation of new knowledge; therefore, the primary product will be publication-quality figures and text to communicate your research results. These will be used in the production of a research poster, which may be presented at the Genetics Society of America Drosophila Research Conference.

Final Oral Presentation 20%

At the end of the course, you will individually give a short presentation of the final class poster.

There is no final exam.

There is no grading curve, as we will all be working as a lab team.

Responsible Conduct of Research

Fabrication or misrepresentation of data at any level will result in failure of all connected post-lab assignments and figures, and will be considered an honor violation. Plagiarism of any written work will also result in failure of the connected assignments and be considered an honor violation. If you are unsure about a particular choice, please come talk to one of us *before* submitting your work.

Excused Absences

We will accommodate absences per Duke University policy (*below*). We are all cautiously optimistic about this semester, but please **communicate** with us and/or with your Dean if issues arise. There are plenty of opportunities to contribute to class research progress; therefore, absences due to quarantine can be accommodated with a combination of Zoom attendance, recorded lectures, and supplemental experiments in the lab once you are cleared to return to class. Make-up work will not be accepted for unexcused absences. Leaving early or returning late from Thanksgiving break travel is not

an excused absence, as that is one of the critical periods of data collection and analysis for these projects.

Forms and more information are found here:

<https://trinity.duke.edu/undergraduate/academic-policies/class-attendance-and-missed-work>

Required Safety Measures for in-person laboratory courses

- Wear a mask indoors as required by Duke policy and follow up to date Covid safety guidelines
- Wear appropriate Personal Protective Equipment when handling hazardous materials