

# Seminar in Neuroscience: Nervous System Injury and Disease

NEUR 411-002: Spring 2024

## Course and Instructor Information

Instructor: Dr. Gwendolyn (Wendy) Lewis

Instructor e-mail: [glewis13@gmu.edu](mailto:glewis13@gmu.edu)

Course Time: Tuesday 10:30am – 1:10pm

Course Location: Angel Cabrera Global Center 1405

Credits: 3

Instructor Office: Krasnow 254

Office Hours: Drop-in office hours are held during the times below. If you are unable to attend a drop-in time, please email me to schedule an appointment.

- **Monday & Tuesday 2:30pm - 3:30pm (virtual or in-person).** Log in virtually <https://gmu.zoom.us/j/4952912681> or come in person to Krasnow 254.
  - If multiple students need to meet at once, in-person visitors will get priority. I'll meet with students in the Zoom room in the order they entered. Please be patient if you are in the Zoom waiting room!
- **Friday 11:00am – 12:00pm (virtual only).** Log in virtually <https://gmu.zoom.us/j/4952912681>
- Office hours change sometimes, check the Announcements in Blackboard for updates

## TA Information

TA: Nooshin Safari

TA e-mail: [nsafari@gmu.edu](mailto:nsafari@gmu.edu)

TA office hours: TBD (Check Blackboard)

## Course Overview

Most likely, you know someone that has been affected by a nervous system disorder. From Traumatic Brain Injury to Alzheimer's Disease, nervous system disorders affect millions of families and have long fascinated doctors, scientists, and the general public. In this course, we will explore what happens when things go wrong in the nervous system. Specifically, we will explore a wide variety of nervous system disorders, focusing primarily on cellular and molecular mechanisms. We will also examine the history, significance, symptoms, and treatment of these disorders. We will accomplish this through a combination of lectures, student-led presentations and discussions, writing exercises and assignments. This course is designed to develop your skills in reading, analyzing, and interpreting scientific data, while emphasizing practical scientific writing and presentation skills.

**This course fulfills the Writing Intensive (WI) requirement for the Neuroscience major.** Writing intensive courses are required to assign a minimum of 3500 words, provide constructive feedback on drafts, and allow revision of at least one graded assignment. This course meets and exceeds this requirement through the news article, grant application, and weekly journal entries. Constructive feedback will be given on assignments. You will be able to revise portions of the grant application, based on feedback, before the final assignment is due.

## Course Modality

This is an in-person, face-to-face course. There will be no concurrent instruction, meaning the class will not be streamed online, and students will not be able to attend virtually. If you are unable to come to class due to illness or other issue, please see the policy under Attendance and Late Work below.

## Textbook

No textbook is required. Some material in the course was adapted from: Diseases of the Nervous System by H Sontheimer, ISBN:9780128002445.

## Learning Goals:

By the end of this course, you should be able to...

- Interpret and analyze primary scientific literature
- Think critically about science and question scientific findings
- Clearly present, explain, and facilitate discussions about scientific data to your peers
- Describe the hallmarks of specific nervous system diseases and explain the cellular and molecular mechanisms involved
- Compare and contrast the mechanisms of different diseases
- Recognize and identify common themes in disease mechanisms
- Examine, analyze, and interpret data from primary literature related to nervous system diseases
- Describe types of disease models and experimental tests used in disease research
- Communicate scientific data for a variety of audiences through translational writing
- Evaluate and critique other's writing
- Develop a unique grant proposal
- Effectively respond to edits and make changes in writing

## Course Format:

This course is divided into sections. Each section will begin with a lecture spotlighting a specific disease. After each disease lecture, there will be one or more student-led discussions about scientific journal articles related to the current disease. In preparation for each discussion, every student will write and submit a brief journal entry. There will be 2 additional larger writing assignments. One is a news article, due near the middle of the term, and the other is a mock grant application, due at the end of the course.

## Grading and Assessments:

There are no exams in this course. You will be assessed throughout the course based on a combination of assignments, discussion leading, and participation.

### Grading Scale:

A+ = 98.00-100%, A = 90.00-97.99%, B+ = 88.00-89.99%, B = 80.00-87.99%, C+ = 78.00-79.99%, C = 70.00-77.99%, D = 60.00-69.99%, F = 0-59.99%

Weighted grades are computed based on the table below:

Area	% of Grade
Discussion Leading	15%
Journal Entries	20%
News Article	15%
Grant Application	25%
Participation/Quizzes/Assignments	25%
<b>Total Grade</b>	<b>100%</b>

### Assignment Details:

**Discussion Leading-** You will work in groups to lead a detailed presentation and discussion of a primary journal article. The goal of this assignment is to improve your ability to communicate, evaluate, and question the scientific findings of others. The primary journal article will be assigned to you. Additional details will be provided.

**Journal Entries-** Before each discussion section, you will write a Journal Entry (max 500 words). The goal of these entries is to get you thinking and writing about science on a regular basis. Entries will be written in response to research articles that will be discussed that day. Entry guidelines may vary by week and will be posted 1 week in advance. Entries will be submitted in Blackboard and will be graded by the TA with constructive feedback given. Entries are due 1 hour before the beginning of class in which the article will be discussed. You may submit one revised journal entry for grade replacement during the semester, which will be due by the last day of class. **You do not need to complete a Journal Entry for the week you lead discussion.**

**News Article-** You will report on the findings of one of the primary journal articles we discuss in class by writing a news article. It will be targeted to the general public (i.e. non-scientists). This article should be something that your parents/grandmother/non-scientist can read and understand. This will help you develop translational writing skills that are essential for disseminating scientific information to the public.

**Grant Application-** Based on previously published data, you will develop a plan for future research and develop an NIH-style grant application. The proposal will be written as though you are a student applying for funding from the NIH to complete the proposed research. The application will be written in the style of a Ruth L. Kirschstein Institutional National Research Service Award (NRSA) from the National Institute of Neurological Diseases and Stroke (NINDS) and will include three essential components of the application: 1) Biosketch 2) Specific Aims, and 3) Research Strategy. Through this process you will learn what is expected from a real grant application, how to write one, and most importantly, how to describe and promote yourself and your ideas. The complete application will be approximately 2000 words and will serve as a capstone for the course. You will submit a draft of the specific aims before the final due date, which I will return to you with notes for editing. You will also be required to meet with me individually to discuss the project before it is due.

**Participation/ Quizzes/ Assignments-** In class participation is vital to your success in this course and will be graded. Attendance is mandatory and included in the participation grade. To receive participation credit, you are expected to arrive on time, be prepared for class, be responsive to questions, participate in discussion sessions, and remain attentive. In order to receive full credit for participation in a discussion session, you must make a meaningful contribution to the discussion, meaning you must talk and your question or comment must represent that you have read the article being discussed. On writing workshop days, you are required to bring a draft of your assignment to

class and participate in the workshop. Up to 5 points of participation credit may be earned per day. Quizzes will be given before the start of each discussion section to check your knowledge of the article being discussed. Additional assignments and completion grades for drafts will also be factored into this portion of the grade. If you are sick, quarantining, or have an excused absence from class, you will be assigned make-up work to earn your participation grade for that day. Please email the instructor to inquire about an excused absence. Makeup work is due two weeks after it is assigned. ***It is your responsibility to ask what make-up work is required for an excused absence.***

## Extra Credit

You can receive up to 5 points of extra credit by attending a seminar and writing a summary, which will be added to the Journal Entry grade. Information on the Seminar Summary can be found in Blackboard under the assignments tab. An extra credit quiz will be given on the Student Choice lecture on the last day of class. No additional or individual extra credit will be available.

## Attendance and Late Work

Unexcused absences will result in a 0 for your daily participation credit. Excused absences are given at the discretion of the instructor and may require documentation. E-mailing the instructor before class is necessary to obtain an excused absence, unless in case of emergency where this would not have been possible. Most absences will require make-up work to receive participation credit for the day. ***If you are sick, please do not attend class!*** Contact me for alternative assignments.

Late work will incur a deduction of 20% and will not be accepted more than 2 weeks after the original due date. No late work will be accepted after the last day of class. Drafts, extra credit, and in-class assignments are not eligible to be turned in late for credit.

## Communication

If you need to contact me, please do so **from your university e-mail account only. Include the course name in the subject line and your name in the e-mail.** Check your Mason e-mail and course Blackboard account daily and before each class meeting. I will use e-mail and Blackboard to communicate with you regarding changes to the course, syllabus, and other essential information. You are responsible for all announcements posted and sent via Blackboard and e-mail, in addition to announcements made in class, regardless of whether or not you are present.

## Student Conduct Policies

Be kind and respectful to your classmates. Disruptive, disrespectful, or rude behavior will lead to dismissal from class, a potential deduction of points from the course, and an unhappy me. You will also miss out on all the cool things we do in class!

**Cell phones in the classroom:** Please silence phones during class and do not use them during class except for emergencies. It's distracting! Cell phone use/ringing (other than for emergency) during class may result in deduction from the participation grade.

**Computers in the classroom:** Computers are allowed for note taking and course related research only. Failure to observe this rule may result in deduction from the participation grade or loss of computer privileges. It will also make me grumpy.

## Academic Integrity

Honesty and integrity are issues at the very core of this course and of science as a whole. George Mason has an honor code with clear guidelines for academic integrity. A few of the most important rules that pertain to this course are: 1) All work submitted must be your own should be done individually unless explicitly stated otherwise. You will be encouraged to discuss ideas, collaborate, and brainstorm with your classmates, but actual assignments need to be completed individually. You may **not** use papers from students who have previously taken the class to help you with your assignments. 2) When referencing the work of others (this includes published and non-published work or ideas), full credit must be given through appropriate citations. 3) If you are ever unsure about the rules for an assignment, ask for clarification. Cheating and plagiarism of any form is not tolerated. Plagiarism means using the exact words, opinions, or information from another person without giving the appropriate credit. Per the Office of Academic Integrity, “subcategories of plagiarism include:

- Self-plagiarism: Intentionally or unintentionally using portions of one’s old work for new assignments without appropriate attribution and/or advanced permission from the current course instructor
- Failure to adequately quote and/or cite sources or material
- False citation: This includes but is not limited to referencing work that does not appear in the indicated source.”

Sharing of instructor-created materials, particularly materials relevant to assignments or exams, to public online "study" sites is considered a violation of Mason's Honor Code. For more information, see the Office of Academic Integrity's [summary of information about online study sites](#).

Any offense will be referred to the academic integrity office and be dealt with in accordance with university regulations. Get more information about the Office of Academic Integrity here:

<https://oai.gmu.edu/>. Get more information about plagiarism here <https://oai.gmu.edu/mason-honor-code/what-is-plagiarism/> and tips for avoiding it here <https://writingcenter.gmu.edu/writing-resources/citing-sources/plagiarism>.

*In the event that an assignment permits the use of Generative-AI tools, usage must follow the fundamental principles of the Honor Code. This includes being honest about the use of these tools for submitted work and including citations when using the work of others, whether individual people or Generative-AI tools.*

**AI Text Generators:** AI Text generators will be allowed (and possibly required) for some of the work in this course, specifically when they can be used as a tool to meet our learning goals. When explicitly stated by the instructor, Generative AI tools are allowed on the named assignment. In other cases, the use of generative AI will contradict our learning goals and will not be permitted. If the assignment instructions do not specifically permit or require the use of generative AI, these tools are not allowed.

**Use of these tools on any assignment not specified will be considered a violation of the academic integrity policy.** All academic integrity violations will be reported to the office of Academic Integrity. Work produced with the aid of Generative AI is not without risk. You will be responsible for any incorrect, biased, or unethical information that is submitted, and you must be transparent with your use, even on assignments where you are required to use Generative AI. **A statement-of-usage is always required** when using generative AI, even when it’s use is required for the assignment. **Citations for source material are always required** whether using generative AI or not.

## Disability Accommodations

If you have a documented learning disability or other condition that may affect academic performance you should: 1) make sure this documentation is on file with Office of Disability Services (SUB I, Rm.

4205; 993-2474; <http://ods.gmu.edu>) to determine the accommodations you need; and 2) talk with me to discuss your accommodation needs. If you are struggling and think a disability may be hindering your learning, please reach out to disability services to see what accommodations are possible.

## Mason Diversity Statement

George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.\*

*\* This is an abbreviated statement, full statement is available at <http://ctfe.gmu.edu/professional-development/mason-diversity-statement/>*

## Student Services

- Learning Services ([learningservices.gmu.edu/keeplearning/](http://learningservices.gmu.edu/keeplearning/))
- University Libraries ([library.gmu.edu](http://library.gmu.edu))
- Writing Center ([writingcenter.gmu.edu](http://writingcenter.gmu.edu))
- Counseling and Psychological Services ([caps.gmu.edu](http://caps.gmu.edu))
- See [a longer list of Mason student support services posted on The Stearns Center website.](#)

## Add/Drop Deadlines

Deadlines for this semester can be found on the [Mason Academic Calendar page](#).

## Course at a Glance

### *Nervous System Injury*

#### PNS Trauma

- Lewis and Kucenas. Perineurial Glia are Essential for Motor Axon Regrowth following Nerve Injury (2014)

#### CNS Trauma

- Mez et al. Clinicopathological Evaluation of Chronic Traumatic Encephalopathy in Players of American Football. JAMA. (2017)

### *Neurodegenerative Diseases*

#### Alzheimer's Disease

- Sevigny et al. The antibody aducanumab reduces A $\beta$  plaques in Alzheimer's Disease. Nature. (2016)

#### Huntington's Disease

- Yang et al. CRISPR/CAS9- mediated gene editing ameliorates neurotoxicity in mouse model of Huntington's disease. (2017)

### *Demyelinating Disorders*

#### Multiple Sclerosis

- Deshmukh et al. A regenerative approach to the treatment of multiple sclerosis. Nature. (2013)

### *Nervous System Cancers*

#### Glioblastoma

- Bao et al. Glioma stem cells promote radioresistance by preferential activation of the DNA damage response. (2006)

### *Infectious Diseases*

#### Prion Diseases

- Fang et al. A neuronal culture system to detect prion synaptotoxicity. (2016)

### *Student Choice Topic*

TBA

## Course Schedule

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Date	Topic	Assignments Due <i>Due 1 hour before class unless noted All assignments submitted to Blackboard unless noted</i>
<b>Week 1</b> Jan 16	Snow Day!	
<b>Week 2</b> Jan 23	<ul style="list-style-type: none"> <li>• Course Introduction</li> <li>• Lecture: Introduction to Scientific Writing</li> <li>• Activities: Form discussion groups, assign papers, review Journal Entry instructions</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Syllabus Quiz</b> (in class)</li> </ul>
<b>Week 3</b> Jan 30 (last day to drop with 100% refund)	<ul style="list-style-type: none"> <li>• Review Discussion Leading instructions</li> <li>• Groups meet</li> <li>• Lecture: PNS Trauma</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Read Plagiarism and Citation material and take quiz</b> (in Blackboard)</li> <li>• Read: “How to Read a Scientific Article” and your assigned article</li> <li>• <b>Journal Entry 1</b> on assigned article (practice/completion grade only)</li> </ul>
<b>Week 4</b> Feb 6	<ul style="list-style-type: none"> <li>• Discussion: PNS Trauma, (Lewis and Kucenas, 2014)</li> <li>• Lecture: CNS Trauma</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Journal Entry 2</b> on PNS Trauma (Lewis and Kucenas, 2014)</li> </ul>
<b>Week 5</b> Feb 13	<ul style="list-style-type: none"> <li>• Discussion: CNS Trauma (Mez et al., 2017)</li> <li>• Lecture: Alzheimer’s Disease</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Journal Entry 3</b> on CNS Trauma (Mez et al., 2017)</li> </ul>
<b>Week 6</b> Feb 20 (last day for unrestricted withdrawal)	<ul style="list-style-type: none"> <li>• Discussion: Alzheimer’s Disease (Sevigny et al., 2016)</li> <li>• Lecture: Huntington’s Disease</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Journal Entry 4</b> on Alzheimer’s Disease (Sevigny et al., 2016)</li> </ul>
<b>Week 7</b> Feb 27	<ul style="list-style-type: none"> <li>• Discussion: Huntington’s Disease (Yang et al. 2017)</li> <li>• Writing a News Article</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Journal Entry 5</b> on Huntington’s Disease (Yang et al. 2017)</li> <li>• <b>“Read the News” Assignment</b></li> </ul>
<b>Week 8</b> Mar 5	<b>No Class: Spring Break!</b>	
<b>Week 9</b> Mar 12	<ul style="list-style-type: none"> <li>• Workshop: News Article Peer Review</li> <li>• Lecture: Multiple Sclerosis</li> </ul>	<ul style="list-style-type: none"> <li>• <b>News Article Draft Due: upload to BB (for completion grade) bring 2 printed copies of your draft to class</b></li> <li>• <b>Final News Article Due Sunday 3/3 11:59pm</b></li> </ul>
<b>Week 10</b> Mar 19	<ul style="list-style-type: none"> <li>• Discussion: Multiple Sclerosis (Deshmukh et al 2013)</li> <li>• Lecture: Glioma</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Journal entry 6</b> on Multiple Sclerosis (Deshmukh et al 2013)</li> </ul>
<b>Week 11</b> Mar 26	<ul style="list-style-type: none"> <li>• Discussion: Glioma (Bao et al. 2006)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Journal entry 7</b> on Glioma (Bao et al. 2006)</li> </ul>

<b>Date</b>	<b>Topic</b>	<b>Assignments Due</b> <i>Due 1 hour before class unless noted</i> <i>All assignments submitted to Blackboard unless noted</i>
(Mar 25 is last day for selective withdrawal)	Writing a Grant/ Experimental Design/ Grant Planning	<b>Read Harrington Chapter 3</b>
<b>Week 12</b> Apr 2	<ul style="list-style-type: none"> <li>• Workshop: Specific Aims Peer Review</li> <li>• Lecture: Prion Diseases</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Specific Aims Draft Due:</b> upload to BB (for completion grade <b>with instructor feedback</b>) AND bring 2 printed copies to class</li> <li>• <b>Sign up for individual meeting</b></li> </ul>
<b>Week 13</b> Apr 9	<b>No Class:</b> Individual meetings via Zoom <a href="https://gmu.zoom.us/j/4952912681">https://gmu.zoom.us/j/4952912681</a>	Be prepared to explain and discuss your aims in the meeting
<b>Week 14</b> Apr 16	<ul style="list-style-type: none"> <li>• Discussion: Prion Diseases (Fang et al. 2016)</li> <li>• Workshop: Writing Exercises/ Self Critique</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Journal entry 8</b> on Prion Diseases (Fang et al. 2016)</li> <li>• Bring a copy of Journal Entry 1 to class (digital or printed)</li> </ul>
<b>Week 15</b> Apr 23	<ul style="list-style-type: none"> <li>• Workshop: Grant Peer Review</li> <li>• Student Choice Lecture or TA talk?</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Full Grant Draft Due:</b> bring 2 printed copies of your draft to class (do not submit to BB)</li> </ul>
<b>Final Grant Due on Thursday April 25<sup>th</sup> at 11:59pm</b>		

**NOTE: This schedule is subject to change at any time. You are responsible for all announcements and syllabus modifications made in class each week whether you are present or not.**

BB = Blackboard