

**Seminar in Neuroscience:**  
**When Good Cells Go Bad- Nervous System Injury and Disease**  
*NEUR 411-001: Spring 2020*

**Instructor:** Dr. Gwendolyn (Wendy) Lewis

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

**Course Time:** Tuesday 1:30 - 4:10pm

**Course Location:** Krasnow 229

**Credits:** 3

**Instructor Office:** Krasnow 254

**Instructor Office Hours:** Wednesday 10am-12pm

**TA:** Jeffrey Kopsick

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

**TA office:** outside of Krasnow 254

**TA office hours:** Friday 11am-12pm

**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 the cellular and molecular mechanisms at play. 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 500-word news article, 2000-word grant application, and 8x600-word 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.

**Textbook**

Textbook (not required): 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 scientific news article, and the other is a mock grant application.

### **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.

Discussion Leading	15%
Journal Entries	25%
News Article	15%
Grant Application	25%
Participation and Assignments	20%

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**Total Grade** **100 %**

### **Grading Scale:**

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

### **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 400-600 word journal entry. The goal of these entries is to get you thinking and writing about science on a regular basis. Journal entries will be written in response to research articles that will be discussed that day. Journal entries will be submitted in Blackboard and will be graded by the TA with constructive feedback given. Entries will be due before the beginning of class in which the article will be discussed. Guidelines will be provided before the first assignment. **You do not need to complete a journal entry for the day you lead discussion.**

**News Article-** You will write a 500-word review of a scientific article, written in the style of 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 sell 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 and Assignments-** In class participation is vital to your success in this course. The TA and I will be monitoring each student's participation during each class. 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 a discussion session, you must make a meaningful contribution to the discussion. 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. **If you do not talk, bring a draft, or are absent, you will not receive participation credit for the day.** Up to 5 points of participation credit may be earned per day. Additional assignments and completion grades for drafts will also be factored into this portion of the grade.

### **Attendance and Late Work**

You are expected to attend class and participate in all discussions and activities. Attendance is an integral part of this course, and absences will result in significant missed information. 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 a doctor's note or other documentation. E-mailing the instructor before class is highly recommended to obtain an excused absence. Given that class meets only once per week and is discussion-based, no more than 2 excused absences will be granted for any reason. Late work will incur a deduction of 10% of the earned grade per day, with no exceptions. If you are absent for an in-class assignment, you will receive a 0 for the assignment. There are no make-ups for participation or in-class assignments.

*\*All attendance and participation policies may be modified on an individual basis at the discretion of the instructor.\**

### **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 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 keep them out of sight. Texting is not allowed. I can see you and 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 as follows: 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. 2) When referencing the work of others (this includes published and non-published work or ideas), full credit must be given through appropriate citations and references. 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. Any offense will result in a grade of F for the course and will be dealt with in accordance with university regulations.

### **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.

### **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/>*

### **Privacy and E-mail Use**

Students must use their Mason email account to receive important University information, including communications related to this class. I will not respond to messages sent from or send messages to a non-Mason email address.

### **Add/Drop Deadlines**

- Last day to add: Jan 28
- Last day to drop (no tuition penalty): Feb 5
- Final drop deadline (50% tuition liability): Feb 11
- Unrestricted Withdrawal period (100% tuition liability, W on transcript): Feb 12 – Feb 24
- Selective-Withdrawal period (100% tuition liability, W on transcript): Feb 25 – Mar 30

## 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

- Tuszynski et al. A phase 1 clinical trial of nerve growth factor gene therapy for Alzheimer disease. Nat Med. (2005)

#### Huntington's Disease

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

### *Neurodevelopmental Disorders*

#### Autism Spectrum Disorder

- Tabuchi et al. A Neuroligin-3 Mutation Implicated in Autism Increases Inhibitory Synaptic Transmission in Mice. Science. (2007)

### *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

- Meyer-Luehmann et al. Exogenous Induction of Cerebral b-Amyloidogenesis Is Governed by Agent and Host. Science. (2006)

### *Student Choice Topic*

TBA

**Course Schedule**  
*NEUR 411-001, Spring 2020*

<b>Date</b>	<b>Topic</b>	<b>Assignments Due</b> (all due before the beginning of class)
Jan 21	Lecture: Introduction to Scientific Writing  Lecture: How to read papers, lead discussion, write journal entries  Form discussion groups, assign papers, assign article summary	
Jan 28	Introduction continued, groups meet to discuss papers  Lecture: PNS Trauma	<b>Article Summary Due: bring a printed copy to class</b>
Feb 4	Discussion: PNS Trauma, (Lewis and Kucenas, 2014)  Lecture: CNS Trauma	<b>Journal entry 1</b> on PNS Trauma (Lewis and Kucenas, 2014) due
Feb 11	Discussion: CNS Trauma (Mez et al., 2017)  Lecture: Alzheimer's Disease	<b>Journal entry 2</b> on CNS Trauma (Mez et al., 2017) due
Feb 18	Discussion: Alzheimer's Disease (Tuszynski et al. 2005)  Lecture: Huntington's Disease	<b>Journal entry 3</b> on Alzheimer's Disease (Tuszynski et al. 2005) due
Feb 25	Discussion: Huntington's Disease (Yang et al. 2017)  Writing a News Article	<b>Journal entry 4</b> on Huntington's Disease (Yang et al. 2017) due
Mar 3	News Article Critique and Workshop  Lecture: Autism Spectrum Disorder	<b>Reading the News Assignment Due: submit to BB</b>  <b>News Article Draft Due: bring 2 printed copies of your draft to class</b>
Mar 10	<b>No Class: Spring Break</b>	
Mar 17	Discussion: Autism Spectrum Disorder (Tabuchi et al. 2007)  Lecture: Multiple Sclerosis	<b>Journal entry 5</b> on Autism Spectrum Disorder (Tabuchi et al. 2007) due  <b>Final News Article Due to BB on Thursday March 19 at 11:59pm</b>
Mar 24	Discussion: Multiple Sclerosis (Deshmukh et al 2013)  Writing a Grant	<b>Journal entry 6</b> on Multiple Sclerosis (Deshmukh et al 2013) due
Mar 31	Specific Aims Critique and Workshop  Lecture: Glioma	<b>Specific Aims Draft Due</b> (upload to BB and bring 2 printed copies to class)

Apr 7	Discussion: Glioma (Bao et al. 2006) Lecture: Prion Diseases	<b>Journal entry 7</b> on Glioma (Bao et al. 2006) due
Apr 14	<b>No Class:</b> Individual meetings this week in my office, <b>Krasnow 254</b>	Be prepared to explain and discuss your aims in the meeting
Apr 21	Discussion: Prion Diseases (Meyer-Luehmann et al. 2006) Writing Exercises/Critique	<b>Journal entry 8</b> on Prion Diseases (Meyer-Luehmann et al. 2006) due <b>Full Grant Draft Due: bring 2 printed copies of your draft to class</b>
Apr 28	Writing Exercises Student Choice Lecture	<b>Print your old article summary and bring it to class (1 copy)</b> <b>Final Grant Due on Thursday April 30 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