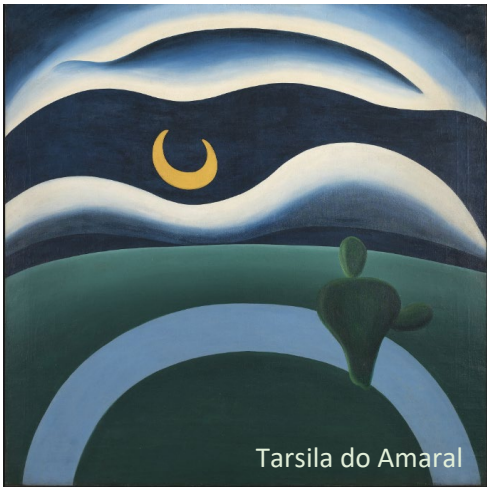
NEUR 424 – Sleep and Circadian Rhythms
Fall 2024



Instructor: Dr. Ren Guerriero (they/them)
Their email: lguerrie@gmu.edu
Their phone #: 703-993-5901
Meeting times: Wednesday 1:30-4:10 pm
Meeting location: Enterprise Hall 274
Office Hours: To be determined
Office Location: Krasnow 253 and Zoom

What is this class?

This course introduces the fields of circadian rhythms with emphasis on sleep including the underlying molecular and genetic machinery, neuroanatomy, and neurophysiology. The impact of sleep and lack thereof will be explored on diseases and modern society. Considerable time will be spent reading and analyzing the primary literature in human and animal models.

What will I get out of this class?

Learning Outcomes:

(1) display knowledge of the systems underlying sleep and circadian biology
(2) identify and explain the causes and consequences of insufficient sleep and
(3) recognize the importance of sleep hygiene for health and optimal performance.

This course also meets the Synthesis requirements for Mason Core. Upon completing this course, you will demonstrate your ability to:

1. Communicate effectively in both oral (**News in Sleep presentations**) and written forms (**Sleep Research Paper**), applying appropriate rhetorical standards (e.g., audience adaptation, language, argument, organization, evidence, etc.)
2. Using perspectives from two or more disciplines, connect issues in a given field to wider intellectual, community or societal concerns (with weekly readings).
3. Apply critical thinking skills to:
    a. Evaluate the quality, credibility and limitations of an argument or a solution using appropriate evidence or resources, OR,
    b. Judge the quality or value of an idea, work, or principle based on appropriate analytics and standards (**Sleep Research Paper – Introduction**)

How do I do well in this class?

This class relies heavily on discussion and readings. 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 them be added to the syllabus. This will include

both instructor and student responsibilities. It is then our job to uphold ourselves and other to the code of conduct.

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

Student responsibilities:

- Being proactive – reach out to Dr. G if you are struggling with class content, advance notice of absences, do the assignments (readings, activity, homework)
- Academic integrity – don't cheat, don't plagiarize (use you own work),
- Be respectful – don't disrupt others in the class, respect group duties and assignments, turn phones and devices off, show up on time (if late, enter quietly), maintain accurate participation with name tents
- Generative AI use, LLM – to be discussed Sept 4

Instructor responsibilities:

- Rubric based grading, grading feedback – return within 2 weeks, constructive criticisms, encourage the good things, be a balanced grader
    - Getting writing feedback – students will ask pointed questions over email or in office hours or before/after class, Dr. G will not pregrade
- Come to class on time – if Dr. G misses, email students the night before to cancel or move class online
- Email reminders – changes to the syllabus, upcoming due dates for large assignments, updates during class
- Class safety – CPR, active shooter, infectious disease, respect,
- Class management – provide breaks, not straight lecture, include active learning something,
- Have fun!

- COVID Policies:
- The integrity of the University community is affected by the individual choices made by each of us. Mason has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using the appropriate format for this class. A simple listing of books or articles is not sufficient. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.
- All course materials posted to Blackboard or other course site are private to this class; by federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this class.
    - Video recordings -- whether made by instructors or students -- of class meetings that include audio, visual, or textual information from other students are private and must not be shared outside the class

- Live video conference meetings (e.g. Collaborate or Zoom) that include audio, textual, or visual information from other students must be viewed privately and not shared with others in your household or recorded and shared outside the class

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	90-96%	B	80-86%	C	70-76%				

Exams (2, 50 points) – You will have two exams: one midterm and one final in this course. They will contain a mixture of multiple choice, short answer, and longer essay questions.

Sleep Research Paper: You will be designing and reporting research on sleep data within a community of interest. This paper will be broken into a few sections to keep you on track throughout the semester. Much of what we know about sleep is from college students, which leads to a lot of bias in the data that we collect. You will be completing research on a community of interest to you (your local place of worship, club, nursing home, etc.). You will gather sleep data from this population, analyze it statistically, then write about them for your final paper. The population of interest and methodology used must be justified in your paper with a review of the literature (the introduction below will be helpful on this). Charts, graphs, tables, or other form of visual aids are expected along with the APA style report. Quantitative data analyses are required (let me know if you need help with statistics).

- **Topic approval** (15 points) – Write a short abstract/ paragraph (no more than 300 words) describing your rationale, subjects of interest, methods, and expected results for you sleep experiment. Upon approval of your topic by Dr. G you can proceed with your project. If you want to start the project earlier, topics can be turned in early.
- **Introduction** (50 points)– The introduction is a description of your logic based on the previous research to support the value of your research questions. It will include 10 primary research articles that you found to support your choice in sleep surveys or other sleep data collection. For each primary article, the introduction should mention its main findings, limitations, and how it relates to your intervention. The introduction's last paragraph ends with a paragraph on your research project with your choice of subjects, methodology, expected results, and hypothesis.
- **Draft of paper** (+5 points to your final research paper or final exam, whichever is lower)– If you so choose, you can turn in a draft of your paper for revision by Dr. G.
- **Final research paper** (80 points)– The final research paper will describe the project you completed throughout the semester with you as the subject. It will be 10 pages in APA style. This will include an introduction, methods, results (include statistical analysis), discussion, and references. A full rubric and description are posted on Blackboard.

News in Sleep presentations (30 points) – Every week, we will have one student present a 10-15 minute talk about a recent breakthrough in the sleep field. This will be based off a primary literature article that was written in 2018 or more recent. Using visual aids such as slides is recommended, but not required. Weeks of assignments will be determined during the first day of class. The week before you must send your journal article to the entire class (email to Dr. G and they can distribute) for discussion.

Participation and Assignments (6 points/day) – Attending class is an essential component of the learning process for the majority of students. The instructor will be monitoring your attendance and participation in the class. In order to receive 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. If you do not talk or are absent, you will not receive credit for the day. Excused absents can be given if you contact Dr. G before missing the class as soon as you are able.

Graduate Students – Neur 689

If you are taking this class as Neur 689 for graduate credit, you will have an extra written assignment, a personal BioSketch. These biographical sketches are required for all grant applications, so this is good practice for your career. They are usually concise versions of your accomplishments and qualifications for a specific role in a project; for this class you will use the Sleep Research Project. The sections are: Personal/Education information; Personal Statement; Positions, Scientific Appointments, and Honors; and Contributions to Science. Examples can be found on the link (choose the predoctoral fellowship biosketch sample).

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. Next, if you miss class, look at Blackboard for the information covered in class. If the article doesn't make sense to you, email Dr. Guerriero. If the slides are confusing, email Dr. Guerriero.

Missed Assignments

- "Life Happens Pass" – For one written assignment this semester you can get an automatic 48-hour extension on the due date, no questions asked. **You must inform Dr. Guerriero in writing (email) to get this pass.**
- All other missed assignments will get a 20% deduction for being late, regardless of the delay. It is to your benefit to turn in assignments late. Most of the points are better than no points!

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 – Fall 2024

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

Date	What we are discussing	How to prepare for class	When is homework due?
Week 1 Aug 28	- Syllabus and code of conduct - What do you know about sleep already? What bothers your sleep?	- Read: Syllabus - Read: Blackboard page	- Pre-Class Survey due Sept 3 at 11:59 pm
Week 2 Sept 4	- Do flies even sleep? The diversity of sleep - How to measure sleep in humans: PSQI, ESS, Sleep journals	- Read: Hobson, 2005 Sleep is by the brain for the brain - Read: Seigel, 2008 Do all animals sleep?	-
Week 3 Sep 11	- How do you describe a rhythm? Phase, phase shifts, zeitgeber - Evolution of sleep in humans	- Read: Yetish *et al*., 2015 Natural sleep and its seasonal variations in pre-industrial societies	-
Week 4 Sep 18	- Neurological and hormonal control of circadian rhythms	- Read: Buxton *et al.,* 2003, Exercise elicits phase shifts and acute alterations of melatonin that vary with circadian phase	- Topic approval for Sleep research paper: due Sep 17 at 11:59 pm
Week 5 Sep 25	- Genetic basis of circadian rhythms	- Read: Vitaterna *et al.,* 1994 Mutagenesis and mapping of a mouse gene, *Clock,* Essential for Circadian Behavior - Skim: Ko and Takahashi, 2006, Molecular component of the mammalian circadian clock	-
Week 6 Oct 2	- Neurological and hormonal control of sleep and circadian rhythms	- Read: Maret *et al.,* 2007, Homer1a is a core brain molecular correlate of sleep loss	- Introduction due Sep 24 at 11:59 pm - Find an app marketed to improve your sleep and be ready to discuss on Oct 23
Week 7 Oct 9	- No Class - SfN Conference	-	
Week 8 Oct 16	- Exam 1	- Study	
Week 9 Oct 23	- Why do I sleep like this? Sleep changes across the lifespan	- Read: Aurora *et al.,* 2016, Habitual sleep duration and all-cause mortality in a general community sample	-
Week 10 Oct 30	- Beginners guide to EEG - Quantification of sleep: What stats do we run?	- Read: EEG Primer	Stop gathering data

Week 11 Nov 6	- Why do we sleep? - Glymphatic system	- Read: Xie *et al.,* 2013, Sleep drives metabolite clearance from the brain	
Week 12 Nov 13	- Sleep disorders	- Read: Joiner, The Neurobiological Basis of Sleep and Sleep Disorders	-
Week 13 Nov 20	- Health outcomes of disrupted rhythms - Racial disparities in sleep and impact on health	- Read: Letzen *et al.,* 2021 Racial disparities in sleep-related cardiac function in young, healthy adults: implications for cardiovascular-related health	- Extra Credit: Draft of Sleep Research paper for feedback due Nov 19 at 11:59 pm
Week 14 Nov 27	No Class - Thanksgiving Break		
Week 15 Dec 4	- Dreaming - Unknowns of sleep - Future directions	- Work on paper	- Sleep Research paper due Dec 3 at 11:59 pm
Finals Dec 11	Exam Week		- Final exam Wed Dec 11 at 1:30-4:15 pm