

**BIPN 194 Advanced Topics in Modern Biology: Physiology and Neuroscience
Biology of Brain Oscillations**

Summer Session I 2023
Instructor: Prof. Stefan Leutgeb

BIPN 194 COURSE DESCRIPTION: The purpose of this course is to learn how to read primary research literature and how to think critically about published scientific findings. This will be taught by exploring classical and recent findings in the field of systems neuroscience, focusing on understanding the neurobiology and function of brain oscillations. Students will read and write a critical evaluation of an assigned scientific paper each week prior to attending and participating in a student-led presentation of 1-2 research papers. Each student will prepare and give one in-class presentation during the quarter. Students will critique each other's presentations and learn to discuss and critically evaluate primary research literature.

Course readings will focus on research investigating neural circuits that generate brain oscillations and on research identifying the function of brain oscillations. Students will present and discuss primary literature that reports classical discoveries and recent groundbreaking findings in the field.

COURSE SCHEDULE: Tuesday/Thursday, 8:00 - 9:30 AM, York 3010

See the course Canvas page ('Course Information' Module) for the schedule of class readings and presentations. This class is organized to facilitate and practice group discussion and in person participation is mandatory. Accommodations can be made for illness and other reasonable circumstances.

PREREQUISITES: Upper division knowledge of neurophysiology, cell biology, and systems neuroscience is assumed. BIPN 140 (Cellular Neurobiology) is a required prerequisite and review of the material that was taught in BIPN 140 is strongly recommended. During this course you may wish you had more background in biostatistics and in quantitative analyses methods, and part of the learning experience in the class is to discuss unfamiliar quantitative methods as we encounter them during the course. However, for those of you interested in becoming involved in scientific research, you should be motivated to seek out courses that provide more formal quantitative training.

INSTRUCTOR: Dr. Stefan Leutgeb, Professor of Neurobiology
E-mail: sleutgeb@ucsd.edu, Note: please include "BIPN 194" in the subject line of e-mails concerning this class. If your e-mail will require an elaborate reply, it is more effective to chat with me after class or in office hour.

OFFICE HOURS: Thursdays 9:45 - 11:15 PM, in Tata 6106. Please e-mail if you plan on coming to office hour other than for the purpose of preparing for your presentation. You have access to the 6th floor of Tata Hall. Faculty offices are on the West end of the building. If the door to the office track is closed, call 858-246-0824.

Each presenter or group of presenters will meet with me on Thursday prior to the week they are presenting in class (Tuesday presenters from 9:45-10:30, Thursday presenters from 10:30-11:15. If this time does not work, coordinate with me to find a meeting time. If presenting as a group, members of the group must coordinate their schedules and then a representative should coordinate with me. The

meeting is intended to provide feedback on presentation materials and answer any questions about the paper to help in presentation preparation. **The meeting will therefore only be valuable if the presenter/group is prepared, i.e. they have read the materials and know what they don't know and need help understanding. Please share the group google presentation with me prior to the meeting so that I can provide helpful feedback on the presentation.**

REQUIRED MATERIALS

Access to Canvas: There is a Canvas site for the course. To access this course, visit <https://canvas.ucsd.edu/courses>. You can also use <http://coursefinder.ucsd.edu>, which will take you to all of your courses on Canvas. If you need any technical assistance with Canvas please send an email to servicedesk@ucsd.edu. Student accounts are added on the first day of class. Instruction on how to access your account for logging on to UCSD's Canvas sites can be found here: <http://acms.ucsd.edu/students/accounts-and-passwords/index.html>. Concurrent enrollment (extension) students are not added automatically. More information for extension students can be found here: <https://extension.ucsd.edu/student-resources/>

Please check the Canvas site often. The **syllabus, course reading schedule, presentation schedule, announcements, updates, and course grades** will be communicated on the CANVAS course website. You will also turn in your weekly writing assignments on CANVAS. *Presentation evaluations will be turned in on paper at the end of each class.*

Computer or tablet and internet connection: You will be accessing and downloading research articles yourself using an official government search engine (PubMed) or journal webpages accessible using the internet, and it will be helpful to have your own device. However, you can also use campus computers to download pdf versions of papers, to write your summaries, and to prepare your presentation.

HOW THIS COURSE WILL BE ORGANIZED

Course Format: The first two lectures will be instructor taught. All other course meetings will be student-led discussions of primary research literature. All meetings will be very interactive, with all students expected to participate in discussions and presentation. **Expect to spend at least 8 hours/week on the assigned reading and summary preparation, and 10+ hours during and prior to the week you are presenting a paper.**

Course Materials: PDFs of the required readings can be found by searching PubMed, a free database of references and publications in the life sciences/biomedical research, offered by the United States National Library of Medicine at NIH (National Institutes of Health). <https://www.ncbi.nlm.nih.gov/pubmed/>

In most cases, you will be able to access a copy of the publication through a link in PubMed. If you are using campus WiFi or a computer on campus, you typically have access to these resources without any additional steps. However, if you are off campus (and occasionally even on campus) you may need to use vpn (vpn.ucsd.edu) to gain access to research articles. PDFs of articles will be provided on the course website if they are not free to download or if they are not searchable on PubMed. In addition, to the discussion papers for each week, other supportive papers can be downloaded/will be provided to give background on concepts covered in the required discussion papers. The background papers are often

review articles that can be dense, but broader in content. There is no course textbook, but textbooks from other courses may help with general background.

Evaluation and Grading: There is no final exam. Your grade will be determined by:

- 1) Your attendance and participation in class. This includes completing the evaluation rubric at the end of each presentation that is not your own (25% of final grade)
- 2) Your summaries of papers presented each week except the week you present (35% of final grade)
- 3) Your performance during your presentation (40% of final grade)

Assignment and Grading Expectations:

1) Attendance and Participation: Attendance is mandatory. Documented medical or family emergencies will be accepted as excuses for missing the class. In this case a 2-page summary of one of the missed discussion papers will be expected upon return to class. **Presentations cannot be made up** (do not sign up for a day you know you cannot attend). The expectations for the 2-page summaries will be discussed when the documented absence is reported. If you have received an exception to attend remotely and unexpectedly miss class due to interruptions in internet connection or computer failure, please notify me by e-mail as soon as possible to discuss your options.

Students will be expected to participate in the discussion of assigned papers during class and to ask questions during the presentation. Your writing assignment requests that you prepare two questions. These questions are good material for you to use in class if asking questions on the fly does not come natural to you. **If students are not participating on their own, the instructor will randomly call on individuals to ask questions and to comment on the discussion papers.**

At the end of each class, all non-presenters will turn in an evaluation of the presentation. A rubric will be provided on paper in the beginning of the class, should be completed during class, and handed in at the end of class. Evaluations will not be accepted at a later date.

2) Weekly assignments and evaluations: You are required to read the assigned papers and write a one-page, single spaced document on one of the assigned papers, except on the day you are presenting. These summaries are due before the beginning of class and are to be submitted using CANVAS. Late papers will not be accepted nor will papers be accepted by e-mail. CANVAS 'Turnitin' requires files in the doc or docx file format. Papers will be scanned for plagiarism and given a 0 if not original. For your summary I am looking for the following information:

1. What is the general question being asked?
2. Why is this question important?
3. What is the specific hypothesis?
4. What are the strengths and weaknesses of the methodology used to test the hypothesis?
5. What conclusions did the authors arrive at from their experiments (be sure to also state the experiment and refer to specific figures when appropriate)?
6. Did their results address their question?
7. Do they prove or disprove their hypothesis?
8. What part of the paper did you find the most convincing or confusing? Why? What is the weakness of the paper?
9. What are the implications for these findings in the field of brain oscillations?
10. What are two unanswered questions you have about the paper?

3) Presentations: Presenters/groups will be determined on the first day of class. Each presenter/group will have 40 minutes for the presentation and 15-20 minutes for questions and discussion. If presenting in a group, each group member will have equal presentation time and should be prepared to answer questions and engage the class in discussions. It is the expectation that each presenter/group will clearly present the question/concept being tested in the paper, the approach by which the question was tested, and the significance of the paper. You will need to look up any background or terminology that you are not familiar with so that you can explain it to the class. A rubric will be used to evaluate your presentation. The rubric is available on CANVAS in order for you to see beforehand how you will be assessed. This rubric is identical to the rubric that will be used by the other students to evaluate your presentation.

Meetings for the presentation. If a group is presenting, the group members needs to exchange contact information (phone numbers and/or e-mail information) and arrange meetings to discuss the overall presentation and how the sections of the paper will be divided amongst the group members. These meetings are essential. I will also meet with the presenter/group on Friday/Monday before the presentation to discuss the papers and help with any questions. This is a mandatory meeting that is intended to help with your presentation. Each presenter/group member should be prepared for this meeting and have read the paper and have prepared slides. Please e-mail the slides to me at least 2 hours before our meeting. After our meeting, the presenter/group should tweak or edit the presentation.

The entire presentation needs to be on one computer in one file or compiled as a shared google presentation (i.e., powerpoint, keynote, google, or a format agreed upon by the entire group) and the presentation needs to be backed up on a memory drive if not a google presentation. One designated person will share the presentation on either their own device or on the instructor's device. **The presenter/presenting group must arrive at the class room 10 minutes early to set up.**

Background/Introduction: In this part of the presentation you need to describe the biological question that the authors were asking. You will need to provide the necessary background for the paper so that your audience can understand the importance of the author's question.

Results: Here you need to logically present the experimental results. How did the authors address their question? Explain the tools and methodology that the authors use to address the hypothesis. What are the specific conclusions from their results? Most figures in papers have multiple panels and some papers have supplementary figures that support the main figure and these are required reading for the paper. You will need to decide which of the supplemental figures should be presented and are vital to the conclusions of the paper. For each figure you should explain what is being tested and why. Most figures have one or two main conclusions. Be sure you are clear about these and can explain these to the class. Make sure you know which piece/pieces of data support the conclusion. Experiments require proper controls, also make sure you understand why the given controls were used and if they are appropriate. Discuss reservations and criticisms about the data, if any.

Conclusions and implications: Overall what are the findings of this paper? Does the data support the conclusions? What are the next steps that follow from these experiments? How do the data impact the field?

Nonpresenters: You are expected to read every paper before coming to class and be prepared to discuss and ask questions. The instructor may call on individuals to answer questions if the class is not participating naturally or when an individual has not commented. During class you will fill out your evaluation rubric, and you will turn the evaluations in before you exit the seminar room. Note, these evaluations need to be constructive and are an important part of your participation grade and will be shared with the presenters for feedback.

Your final grade is based upon the following (as described above):

- 1) Attendance/participation/rubric = 25%
- 2) Weekly written summaries = 35%
- 3) Presentation = 40%

To determine your overall grade, please use the following formula:

Total percentage = [(% participation) x 0.25] + [(% written summaries) x 0.35] + [(% Presentation) x 0.40]

Grading Scale: (based on total course percentage, scores rounded to the nearest whole number)

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| A | 93% to 100% |
| A- | 90% to <93% |
| B+ | 86% to <90% |
| B | 83% to <86% |
| B- | 80% to <83% |
| C+ | 76% to < 80% |
| C | 73% to <76% |
| C- | 70% to <73% (everything above this line is considered passing if grading P, NP) |
| D | <70% to 60% (there is no D+ or D-) |
| F | < 60% |

STUDENTS WITH SPECIAL CIRCUMSTANCES: UCSD is committed to education for all people. Services and reasonable accommodations are available to students with temporary and permanent disabilities, to students with DACA or undocumented status, to students facing mental health issues, other personal situations, and to students with other kinds of learning needs. Please feel free to let the instructor know if there are circumstances affecting your ability to participate in class. Some resources that might be of interest include:

- Office for Student with Disability, <https://students.ucsd.edu/well-being/disability-services/index.html>
- UC San Diego CAPS (Counseling & Psychological Services), <https://wellness.ucsd.edu/CAPS/Pages/default.aspx>
- UC San Diego Undocumented Student Services, <https://uss.ucsd.edu/> Note: a list of campus resources can be found here: <https://students.ucsd.edu/sponsor/undoc/resources/index.html>
- Learning Strategies Center, <https://commons.ucsd.edu/academic-support/learning-strategies/index.html>

Students requesting accommodations and services due to a disability for this course need to provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities

(OSD), prior to eligibility for requests. Receipt of AFAs in advance is necessary for appropriate planning for the provision of reasonable accommodations. OSD Academic Liaisons also need to receive current AFAs. For more information, contact the OSD at (858) 534.4382 (V); (858) 534-9709 (TTY); osd@ucsd.edu, or <http://osd.ucsd.edu>. **You will need to coordinate any special scheduling for the presentation/participation with the instructor. All of these arrangements should be made within the first two weeks of the quarter.**

ACADEMIC INTEGRITY: Academic dishonesty will not be tolerated. According to UCSD policy, academic dishonesty includes:

- Completing assignments for another student or allowing another student to complete an assignment for you.
- Copying another student's work or allowing another student to copy your work.
- Assistance by AI/chatbots for generating paper summaries is NOT allowed
- **Incorporating plagiarized material into assignments.**
- Faking a family emergency or medical condition

All suspicions of academic misconduct will be reported to the Academic Integrity Office according to university policy. The Policy on Integrity of Scholarship (academicintegrity.ucsd.edu) and this syllabus list some of the standards by which you are expected to complete your academic work, but your good ethical judgment (or asking for advice) is also expected as we cannot list every behavior that is unethical or not in the spirit of academic integrity.

Those students found to have committed academic misconduct will face administrative sanctions imposed by their college Dean of Student Affairs and academic sanctions imposed by the instructor. The standard administrative sanctions include: the creation of a disciplinary record (which will be checked by graduate and professional schools); disciplinary probation; and attendance at an Academic Integrity Seminar (at a cost of \$75). Students can also face suspension and dismissal from the University; those sanctions are not at the instructors' discretion. Note: the Instructors sanctions state that students will receive a final grade of 'F' if academic dishonesty is confirmed in addition to other disciplinary actions deemed appropriate by the Academic Integrity Office. Students who assist in or are complicit with cheating could also be in violation of the Policy. Thus, students who become aware of their peers either facilitating academic misconduct or committing it should report their suspicions to an instructor for investigation.

See: <http://weber.ucsd.edu/~dkjordan/resources/cheat.html> for additional information.