BIPN 194 (BGGN 284) Advanced Topics in Modern Biology: Physiology and Neuroscience
Brain Systems for Spatial Navigation
Fall, 2019

Class Meeting Time: Friday, 9:00AM - 10:20AM
Location: York Hall 3010

Instructor: Jill K. Leutgeb, Professor of Neurobiology
E-mail: jleutgeb@ucsd.edu, Note: please include "BIPN 194 or BGGN 284" in the subject line of e-mails concerning this class. If your e-mail requires an elaborate reply, please see me before or after class, or during office hours.

Office Hours: Mondays 3:00 - 4:00 PM. Office: Pacific Hall 3125A
Additionally, each presentation group will meet with me on Monday/Tuesday of the week they are presenting a paper in class. Members of the group must coordinate their schedules and then a representative should coordinate with me to find a time we can meet. Meeting during office hour is preferred. 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 only continue if the group is prepared, i.e. they have read the materials and know what they don't know and need help understanding.

Course TritonED website: There is a TritonED site for the course (tritoned.ucsd.edu). Student accounts are added the first day of class. The **syllabus, course schedule, presentation schedule, announcements, updates, and course grades** will be communicated on the course TritonED website.

Course Overview: The purpose of this course is to learn how to read primary research literature and think critically about published scientific findings. This will be taught by exploring the most recent findings in the field of systems neuroscience, focusing on understanding the neurobiology in support of spatial navigation.

Course readings will focus on research investigating the neural networks in the brain that underlie spatial navigation and pathfinding. How does the brain create maps of space that guide navigation in complex environments? The 2014 Nobel Prize in Physiology or Medicine was awarded for the discovery of the brains "inner GPS" system. Students will present and discuss the primary literature describing the current state of the field and recent implications for artificial intelligence.

Course Format: The first lecture 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 three hours/week on the assigned reading and summary preparation, and 10+ hours the week you are presenting a paper.**

Prerequisites: Upper division knowledge of neurophysiology, cell biology, and systems neuroscience is assumed. BIPN 100 (Human Physiology) or BIPN 140 (Cellular Neurobiology) are required prerequisites. However, BIPN 140 is strongly recommended.

Course Materials: PDFs of the required reading can be found by searching PubMed, a free database of references and publications of the life sciences and biomedical research, offered by the United States

National Library of Medicine at NIH (National Institutes of Health).
https://www.ncbi.nlm.nih.gov/pubmed/
PDFs will also be provided on the course website if they are not free to download on PubMed. The UCSD library has subscriptions to most major life sciences journals. Be sure to be logged into the UCSD server while searching PubMed in order to have access to all journal subscriptions. In addition, PDFs of other supportive papers will be provided to give additional background on concepts covered in the required reading. These are often review articles that can be dense, but broader in content. These papers will be provided in PDF form on the course website. 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 returning 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 group 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 the missed manuscript will be expected upon return to class, presentations cannot be made up. The expectations for the summary will be discussed when the documented absence is reported. Students will be expected to participate in the discussion of assigned papers during class and to ask questions during the presentation. Unexcused absences or arriving late will impact your participation grade. **If students are not participating on their own, the instructor will randomly call on individuals to respond to questions and comments.**

Immediately, at the end of each class, all non-presenters will turn in an evaluation of the presentation. A rubric will be provided and should be picked up at the beginning of class. Evaluations will not be accepted after the class period.

2) Weekly assignments and evaluations: You are required to read the assigned paper and write a one page, single spaced document on the assigned paper, except on the day you are presenting. These **summaries are due at the beginning of class. Late papers will not be accepted, nor will papers be accepted by e-mail**. 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 spatial navigation?
   10. What are two questions you have about the paper?

3) Presentations: Groups will be determined on the first day of class. Each group will have 40 minutes for the presentation and 15-20 minutes for questions and discussion. 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 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 TritonEd.

Group meetings for the presentation. Each group of presenters needs to exchange contact information (phone numbers and 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 entire group on Monday/Tuesday before the presentation to discuss the presentation and help with any questions. This is a mandatory meeting that will help with your presentation. Each group member should be prepared for this meeting and have read the paper and prepared 4-5 slides. After our meeting, the group may wish to meet again to tweak or edit the presentation.

The group's entire presentation needs to be on one computer in one file or compiled as a 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. One paper copy of the presentation should be handed to the instructor at the beginning of class. This will be used to provide written comments and feedback. The presenting group must arrive 10 minutes early to set up. **You are responsible for bringing an adaptor to connect the presentation computer to the VGA projector**. If you don't have one, they can be checked out from Geisel Library through the Tech Lending Program.

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? I recommend that each group member presents one or two figures each. Most figures in papers have multiple panels. Many 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. 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. During class you are expected to participate in discussion and ask questions. The instructor will pick on individuals randomly to answer questions if the class is not

participating naturally, or an individual has not commented. At the end of each class you will fill out your evaluation rubric and turn it in when you leave the class. 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.

Technology Etiquette: Please refrain from engaging in personal internet or communications during class and ensure that your cell phones and tablets are turned off. If you have compelling reasons that such a device should remain on, please talk to me before class.

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.
- **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 dishonestly 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.

Your final grade is based upon the following (as described in the course syllabus):
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:

A$^+$	≥ 100.00% (An A$^+$ grade is reserved for those that reach or exceed 100%)
A	93.33%
A$^-$	90.00%
B$^+$	86.66%
B	83.33%
B$^-$	80.00%
C$^+$	76.66%
C	73.33%
C$^-$	70.00%
D	< 70.00% (there is no D+ or D-)
F	< 60.00%