

Syllabus - BB 407H: Learn to Love Your Lying Eyes (and Brain)

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Term: Fall 2020
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Welcome to BB 407H!

We humans can pick a single voice out of a noisy room, instantly recognize a childhood friend, and easily read mesperillid words. Our brains are amazing! Why, then, was the world briefly paralyzed in 2015, when we couldn't even agree whether "The Dress" was white and gold or blue and black? The answer is that our brains are messy, complicated machines, remarkably good at many things, but easily fooled by others. In this class, we will explore sensory illusions that reveal the limits of our brains, then discuss research in neuroscience and psychology that helps explain our experiences. We will practice analyzing and creating scientific writing, and presenting it to peers. Finally, we will reflect on how our knowledge of our brains' imperfections can inform our approach to the debates and challenges of society today. This course will be a fun and active introduction to our human brains. It assumes no previous neuroscience or biology coursework.

I am here to help you learn. I'm always happy to answer your questions, discuss your learning strategies, and to use your feedback to improve this course. When in doubt, reach out to me. This course has no prerequisites, and it is my responsibility to make the course goals achievable regardless of your previous classwork and experience. If something is unclear or incompletely explained, please let me know and I will gladly try again.

Learning Goals and Objectives:

We will focus on building the following skills during this course:

Learning Goal 1: Students will understand fundamental neural biology and apply it to understanding sensation, perception, and sensory illusions

- Learning Objective 1.1: By Week 3, students will be able to describe the mechanisms underlying action potentials, synaptic transmission, and information processing in neural circuits.
- LO 1.2: By Week 4, students will apply information about neuronal wiring and firing properties to explain sensory illusions.

LG2: Students will research and synthesize scientific information, and collaboratively discuss the personal and societal impact of neural biases.

- LO 2.1: Between Weeks 3 and 7, students will use course resources to analyze and present scientific literature to their peers, and lead or participate in class discussion.
- LO 2.2: By Week 4, students will design and propose an original investigation into a way in which human sensation and/or cognition impacts a topic of their interest.

- LO 2.3: In Week 4 and Week 9, students will present and facilitate a discussion on their proposed investigation.
- LO 2.4: Throughout the term, students will constructively assess and seek to improve the quality of their own and their peers' scientific communication.

LG3: Students will reflect on their own perceptions of sensory illusions and experiences, and connect their reflections with larger societal issues.

- LO 3.1: Throughout the term, students will reflect upon their own perceptions of sensory illusions and experiences by completing reflective journal entries each week.
- LO 3.2: In Week 10, students will analyze and generate ideas about how neural strengths and limitations should shape our perceptions of society and each other.

Required Texts

Brain Bugs: How the Brain's Flaws Shape Our Lives. Dean Buonomano; ISBN-10: 9780393342222. Note: you may purchase this book however you like – Kindle/ebook, in paper, online, used, from the Beaver Store, etc.

Academic and magazine articles, and videos, which I will post on Canvas.

Logistics

We will meet for one two-hour session each week of the term. We will about half of that time probing the capabilities and limits of our own brains, experiencing and reflecting on a wide array of sensory illusions and experiments. The remainder of the time will be spent in student-led discussions of these experiences, grounding them in scientific literature examining their neural underpinnings. Students will form groups, and each group will be responsible for things like leading discussions and preparing presentations on topics related to what we cover in the course. Student groups will also plan and carry out an investigation into a real-world impact of some property of human sensation and perception, which relates to their own backgrounds or interests.

This class will focus heavily on discussion and hands-on experience. As a student, you will help to run this course, by teaching your classmates and tailoring each assignment to reflect your identity and interests. It is therefore vital that you come prepared, having done the reading and ready to carry out any responsibilities your group has, to each class. Please stay caught up and come to each class ready to participate!

Canvas & Zoom

Readings, important announcements and occasional fun sensory illusions will be posted on Canvas throughout the term. Please make sure that you have access to the course's Canvas page. I recommend setting your Canvas notifications so you receive Announcements promptly –

either “notify me right away” or “send daily summary.” Instructions:
<https://community.canvaslms.com/docs/DOC-10624>

We will use Zoom for our weekly meetings. You will need to participate during our meetings each week, using Zoom to have discussions, ask questions, and share interesting illusions with your classmates and me. Please ensure that your device is set up with Zoom installed as per OSU’s guidelines: <https://is.oregonstate.edu/zoom/getting-started> Also be sure that during each class meeting, you are in a quiet location with good internet, and a power source for your device (Zoom uses a lot of power!). I encourage you to turn on your camera during our meetings if possible, as this helps everyone have a more authentic, connected conversation.

Grading

This class is meant to introduce students with a diverse range of interests and backgrounds to sensory neuroscience, and to drive reflection on our own cognition. Because these topics will be unfamiliar to many, I have chosen to grade this course on a Pass/No Pass (P/N) basis, allowing you to become familiar with the material without the need to worry about every point. Each assignment below will be graded either with a “check” or a “no check,” based on whether the work does a good job meeting the requirements. I will provide clear rubrics and instructions for each assignment so you know the expectations. When you receive a check on an assignment, you’ll get the full number of points listed in the table below. A “Pass” grade will be awarded to students earning a total of 75 points (75%) or higher. I encourage you to contact me if you are experiencing an issue that is affecting your performance in this course. While I will not create extra credit opportunities to improve students’ grades (this would be unfair to the rest of the class), I am more than willing to be flexible and creative in order to help ensure that you have equitable access to and benefit from the course material.

Your learning will be assessed by the following work. Detailed instructions, deadlines, and any changes for each of these will be posted on Canvas.

- Participation in in-class discussions connecting the course readings with your hands-on experiences with sensation and perception
- Problem sets to practice and apply course material
- Working in a group, leading the in-class discussion of a week’s assigned readings.
- A brief presentation and writeup (prepared individually with support and feedback from your group) proposing an investigation into a sensory phenomenon, or the impact of some aspect of human perception on the real world.
- A final presentation and writeup carrying out the proposed investigation, and posing further questions that you generated while conducting your research.
- A course journal in which you will reflect on the course readings and discussions, discuss your ideas for your research topic and your group’s process for completing it, and consider the real-world implications of what we learn in class
- Feedback provided to your instructor and classmates to help you practice assessing and creating scientific communication.

Table of assignments and the learning objectives that they support:

<u>Assignment</u>	<u>Points</u>	<u>Learning Objective</u>
Meet the class; pre- and mid-course surveys	7	
Problem set #1	5	LO 1.1
Problem set #2	5	LO 1.2
In-class attendance and participation (10 x 1 pts)	10	LO 2.1
Present and lead discussion on a week's readings	10	LO 2.1
Initial research proposal presentation	5	LO 2.3
Initial research proposal in-class feedback to peers	4	LO 2.4
Initial research proposal writeup	5	LO 2.2
Final research group rehearsal	6	LO 2.4
Final research presentation	14	LO 2.3
Final research writeup	14	LO 2.3
Reflective journal (collected 10 times x 1.5 pts)	15	LO 3.1 & 3.2
TOTAL	100	

There are four policies regarding attendance and late work in this course.

- Attendance at each class is important, but not required – I understand that life happens. However, with the exceptions below, it is generally not possible to make up work late, so please be careful. Note that attendance in Weeks 4 and 9 is especially critical.
- Some of the coursework is done for the purpose of preparing for and contributing to class. This work, including in-class participation and each group's leading the discussion of the readings for their assigned week, cannot be made up late, because it would no longer be of benefit to the class.
- Journal entries and problem sets may be submitted late, but their score will be reduced by 20% per day, up to 4 days.
- In exceptional circumstances, it may be possible to reschedule a group's research proposal presentation and writeup, but this would require adjusting the class schedule. Please contact me as soon as possible if you foresee an issue with delivering either of the research presentations and writeups as scheduled.

Policies

Classroom Environment: The University, and this class, should be a safe and comfortable working environment for all students. The expectation is that no one should feel awkward, embarrassed, unwelcome, or uncomfortable engaging in classroom activities or discussions. We must pay particular attention to this in this course, because the act of examining the workings and limitations of our own brains requires a certain amount of personal vulnerability and trust. Please be conscious of your own language and behavior – it must be respectful to all other

participants in this course. If you are having any problems or need help, please bring it to my attention. It is my job to facilitate your education.

Readings: Please bring a copy of the assigned readings (digital or paper) to each class. You are responsible for doing the reading and coming ready to discuss them.

Expectations for Student Conduct: As in all your classes, you are responsible for understanding and complying with Oregon State's expectations for student conduct. You can view the full code of conduct at: <http://studentlife.oregonstate.edu/code> and you can view the Student Conduct and Community Standards site here: <http://studentlife.oregonstate.edu/studentconduct>. I have listed a few items below about academic integrity. This is only one part of the Student Conduct Code; it is very important that you understand the full Code.

Academic Integrity: In any situation of academic dishonesty, I will document the incident, permit you to provide an explanation, advise you of possible penalties, and take action. I may impose any academic penalty up to and including an "N" (No Pass) grade in the course.

The following is a condensed version of the Student Conduct Code on Academic Dishonesty. Academic or Scholarly Dishonesty is defined as an act of deception in which a student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the student's own efforts or the efforts of another. It includes:

(A) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information.

(B) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

(C) ASSISTING - helping another commit an act of academic dishonesty.

(D) TAMPERING - altering or interfering with evaluation instruments or documents.

(E) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

Students with Disabilities: Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved

academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Diversity Statement: The College of Science strives to create an affirming climate for all students including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or mental ability, religion, socioeconomic background, veteran status, sexual orientation, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

Religious Holiday Statement: Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.

Classroom Environment

The University, and this laboratory, should be a safe and comfortable working environment for all students. The expectation is that no one should feel awkward, embarrassed, unwelcome, or uncomfortable engaging in classroom activities or discussions. Please be conscious of your own language and behavior – it should be respectful to the other students and your instructors. If you are having any problems or need help, please bring it to my attention. It is my job to facilitate your education.

Reach Out for Success: University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success at oregonstate.edu/ReachOut. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255)

Schedule (updates will be posted on the Syllabus page and in Announcements on Canvas)

<u>Week</u>	<u>Date</u>	<u>Class</u>	<u>Topic</u>	<u>Readings due for class</u>	<u>Assignments (due date)</u>
0	9/23	1	Introduction	None	None Journal #1 (Sun after class)
1	9/30	2	Basics	Brain Bugs: Introduction; Intro to Neurons (Canvas)	Pre-Course Survey (before class); Meet the Class (before class) Journal #2 (Sun after class)
2	10/7	3	Vision	Brain Bugs: Chapter 1; Synapses and Circuits (Canvas)	Problem Set #1 (before class); Journal #3 (Sun after class)
3	10/14	4	Audition	TBA	Problem Set #2 (before class); Journal #4 (Sun after class)
4	10/21	5	Brief presentations on research proposals	None	Present initial research proposal (in class); Feedback on initial proposals (in class) Journal #5 (Sun after class)
5	10/28	6	TBA (led by Group A)	TBA	Initial research proposal writeup (before class); Journal #6 (Sun after class) Mid-Course Survey (Sun after class)
6	11/4	7	TBA (led by Group B)	TBA	Journal #7 (Sun after class)
7	11/11	7	None	None – Veterans Day Holiday	None
8	11/18	8	TBA (led by Group C)	TBA	Journal #8 (Sun after class)
9	11/25	9	Final group presentations	None	Meet group to practice presentation (outside class); Present final research proposal (in class); Journal #9 (Sun after class)
10	12/2	10	Cognition	TBA	Final research proposal writeup (before class); Journal #10 (Sun after class)