How to build a sense: mechanisms of sensory system evolution and development

Class time and location:
521 Carr Hall
Tues 10:40a-12:35p, Thurs 11:45a-12:35p

Class Overview and Format

In this course we will read and discuss both classic and current literature investigating mechanisms that build sensory traits in animal development. Readings will form a comparative survey of sensory systems highlighting functional-genetic studies in diverse lineages and well-studied animal models.

Students should expect to read on average a research article each week and any background reading required for understanding the paper, and be prepared to hold an in-depth discussion in class. Tuesdays will primarily take the format of a structured journal club, while Thursdays will serve for overflow discussion, questions, and some background on our next topic. Depending on class size, we will have some form of a debate-style journal club, with some people assigned to present the paper from the authors' point of view, and others assigned to respectfully critique and poke holes in it.

Modules will be loosely organized around different senses: photoreception, mechanoreception, chemoreception, and some discussion of other senses like magneto- and electro-reception. I will choose articles at first, and later in the semester students will choose journal articles they are interested in. Topics ultimately will be flexible and tailored to student interests.

Journal articles will be posted at minimum one week before the class is scheduled to discuss them. When students choose, please use Canvas to upload a pdf of the article you have chosen ***at least one week before*** we are scheduled to discuss it. If anyone does not have access to electronic versions at home or in class, please speak to me and I can print class material out for you.

Textbook: N/A

Course Website (e-Learning):
Class material will be posted on the Canvas e-Learning website (http://lss.at.ufl.edu). You are responsible for receiving all Announcements made in lecture and/or posted on the course website for this class.

The Instructor – Kyle J McCulloch

I am a new assistant professor in the Department of Biology at UF and I'm excited to be here! My research is broadly focused on the evolution of light sensing systems of all kinds, taking a multidisciplinary approach to understand how photoreceptor cells evolve and function.

I was most recently a research assistant professor in Ecology Evolution and Behavior department at the University of Minnesota working on light-mediated behavior and developmental biology of the sea anemone *Nematostella vectensis.* Previously I was a postdoc at Harvard working on squid lens development and evolution, and before that I received my PhD from UC Irvine working on *Heliconius* butterfly color vision evolution and neurophysiology.

I want this class to be casual, not stressful, but still engaging and curiosity-driven. I am happy to chat with you about your interests in science (whether that's related to my work or not) and any other professional development questions you might have during your grad career and beyond. Please do feel free to chat with me about anything and don't be afraid to ask questions throughout the semester!

Contact: k.mcculloch1@ufl.edu
Phone: TBD
Office: Temporary office – will be announced in class.
Office Hours: Thurs 12:35p-1:35p or drop in if my door is open

Course Objectives and Expectations

The goal of this special topics course is to get you to think about the processes of evolution and development using animal (and beyond?) sensory systems as examples. We will touch on the process of evolution from multiple different perspectives, incorporating other aspects of modern Biology such as genomics, development, and neuroscience. We will also touch on the philosophy of science, the human process of doing science, and scientific careers. As this is a small seminar, we can vary how much we talk about any of these based on everyone's interests.

Students will learn about techniques that can be applied to "your favorite animal" with the goal that as a field we can increase comparative examples to better understand trait function and evolution. At the end of the course students should have a baseline understanding of multiple sensory systems, and how comparative examples help inform our understanding of evolution more broadly. You will also develop skills in critical thinking and evidence-based inquiry, scientific reading and communication.

Not knowing everything is okay but not trying is not. I expect evidence of effort each week that you tried to think about the things you did not understand. "I didn't get it" does not count as effort. As this is a grad-level class, I expect you to know how to find out something if you don't know it, but also recognize you are busy and don't have all the time in the world for this class. Specific, high-level questions that you got stuck on are good for class discussion, and will help the rest of the class as well.

A note on respectful debate

I hope that discussion is engaging and exciting for you. I have designed the class to get you to think, to talk about it, and to find logical holes in the articles that are presented. *Especially* if you disagree with something, it would be beneficial to hear it.

While I encourage a lively discussion this is to be kept **strictly** respectful and to **never** be personal. **I will not tolerate disrespectful, harassing, or discriminatory behavior in any way** (please refer to university policy for definitions and resources as to what this means). While we can debate the intellectual merits of an experiment or a hypothesis in science, keep your discussions based on the evidence, and if you disagree with someone make sure it is **highly respectful**. Debate in science is healthy and good, but everyone in this class must be comfortable to be heard and equally part of the class, even in disagreement.

If you know you are a talker, and some people are quieter, reflect and allow space for others to speak before jumping in. Alternatively if you are typically on the quieter side, this is a safe, low-stakes way to get your voice out there, and not to feel self-conscious about being "wrong." If you have been made to feel uncomfortable in any way please come to me directly, I take this extremely seriously.

Grading

Grade is based on participation. There must be evidence in class that you read the assigned material each week before class. There are no major writing assignments, exams, or quizzes. Therefore you really must **be in class** *and* **participate** in order to get a satisfactory grade. I should be notified about planned absences prior to missing class whenever possible. Multiple unexcused absences will result in a low grade. Makeup work will be in the form of a writing assignment about the article that week.

Attendance:	40%
Journal article presentation	30%
Rebuttal participation	30%

University Attendance Policy:
https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

University Grading Policy:
https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

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Accommodations for students with disabilities: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. See the "Get Started With the DRC" webpage (https://disability.ufl.edu/get-started/) on the Disability Resource Center site. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Online course evaluations: Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Campus Resources:

Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website https://umatter.ufl.edu/ to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website https://counseling.ufl.edu/ or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website https://shcc.ufl.edu/.

University Police Department: Visit UF Police Department website https://police.ufl.edu/ or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website https://ufhealth.org/locations/uf-health-shands-emergency-room-trauma-center/.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website https://gatorwell.ufsa.ufl.edu/ or call 352-273-4450.

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk https://it.ufl.edu/helpdesk/ at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services https://career.ufl.edu/.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources. Call 866-281-6309 or email ask@ufl.libanswers.com for more information. https://uflib.ufl.edu/

Teaching Center: 1317 Turlington Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring. https://umatter.ufl.edu/office/teaching-center/

Writing Studio: Daytime (9:30am-3:30pm): 2215 Turlington Hall, 352-846-1138 | Evening (5:00pm-7:00pm): 1545 W University Avenue (Library West, Rm. 339). Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/

Academic Complaints: Office of the Ombuds; Visit the Complaint Portal webpage for more information. https://www.ombuds.ufl.edu/complaint-portal/

Enrollment Management Complaints (Registrar, Financial Aid, Admissions): View the Student Complaint Procedure webpage for more information. https://em.ufl.edu/complaint