

Course Info

Schedule:

Meetings: Tuesday / Thursday, 1:15 - 3:15 pm in Northwest Building 425

Coaching: Tuesday / Thursday, 3:30 - 5:30 pm in Northwest Building 426

Instructors:

Ethan Garner | egarner@g.harvard.edu

Josh Sanes | sanesj@mcb.harvard.edu

Venki Murthy | vnmurthy@fas.harvard.edu

We are happy to meet for office hours- please reach out via email to schedule.

Instructional Staff:

TF: Tien Nguyen | tien_nguyen@g.harvard.edu

Tien is happy to meet whenever, just send him an email or slack on the FAS/MCB program slack :)

Course Description:

MCB292 teaches students the necessary skills to be independent scientists while exploring selected, fundamental topics in cell biology, developmental biology, and neurobiology. By conducting student-led presentations of this material, students are taught skills in public speaking and data presentation. Through an ongoing set of writing exercises, students are taught how to choose, defend, and address scientific questions, as well as learn good grantsmanship. Students will also learn how to evaluate scientific literature by reading and presenting primary research publications.

Course Format:

MCB 292 will be “flipped”, with the students presenting and teaching other students. A faculty-led introductory lecture will be given at the beginning of each module (cell biology, developmental biology, and neurobiology). Then, students will lead the classes through lectures and paper discussions. Each student is required to give one lecture and one paper presentation. **All students should read the papers in advance and come to class with an open mind, ready to engage in discussion.**

In parallel to the presentations, all students will be preparing an F31-style proposal throughout the course.

Additional details and expectations for presentations and proposals are down below.

Student Presentations

Students will have the opportunity to pick which field and topic for their lecture and paper presentations on the first day of class. **Lecture and Paper presentations may NOT be in the same module (ie. both presentations cannot be in neurobiology module).** Students who do not choose their topics will be randomly assigned one by Tien.

Prior to the coaching session, **presenters are required check in with the leading faculty for at least**

10 minutes to discuss their plan and vision for the presentation. Students are expected to notify the appropriate faculty ahead of time of when they want to meet. This can be either formally scheduled or even before/after class, just let the faculty know in advance. Faculty will provide input and feedback to help guide the students as they continue to build their presentation.

Lecture Presentations:

Each student will present a 25-30 minute lecture on the assigned topic, followed by 10 minutes Q&A. The lecture presentation should aim to tell a story within the assigned topic. Presenters will have full reign and control on how they want to design their lecture. It is **highly encouraged** to schedule a meeting with the leading faculty to plan and refine the presentation!!! They are here to help!! Relevant reading material will be provided as a starting point but should not be the primary focus of the presentation.

Refer to the [Expectations and Guidelines for Lecture Presentations](#) for complete instructions.

Refer to the [Lecture Presentation Rubric](#) for grading information.

Student Paper Presentations:

Each student will lead a 25-30 minute presentation on an assigned primary research publication, followed by 10 minutes Q&A. Presenters are encouraged to engage the audience (ask questions) and initiate and moderate discussions. The focus of the presentation should be the assigned publication with relevant background when necessary. The presenter should not plan on going through every figure and panel, instead, craft a story with the key experiments.

Refer to the [Expectations and Guidelines for Paper Presentations](#) for complete instructions.

Refer to the [Paper Presentation Rubric](#) for grading information.

Coaching Sessions:

All students will meet with Tien to go through their presentations before formally presenting to the rest of the class. Tien will provide feedback on logic, cohesion, scope, and overall flow on the presentation, enabling the presenter to revise if necessary. Do not come to these coaching sessions unprepared. Your slides must be (mostly) done and you should have an idea of what you want to say. It does not need to be perfect or rehearsed, but do not come with a skeleton. Send your slides to Tien the night before your coaching session. Preparedness for coaching session and improvement afterwards will be taken into consideration for overall presentation grade.

If you are presenting on Tuesday, your coaching session will happen the previous Thursday after class.

If you are presenting on Thursday, your coaching session will happen the Tuesday of the same week after class.

Participation:

All students will be graded on participation. This can come in the form of asking questions or offering opinions when prompted. This class is significantly more enjoyable when everyone is present and engaged. It is okay to be nervous and afraid to ask questions in lectures and seminars - we all felt it at some point. It is our goal to try to cultivate a safe, and judge-free environment to make everyone feel comfortable to share their thoughts.

To facilitate discussion, we may ask questions to the audience and presenter and may occasionally randomly call on students. **Participation will be graded!**

Presentation Feedback:

At the conclusion of each student lecture or paper presentation, the class will give feedback to the presenter. This will count towards participation. Learning how to give and receive back is essential for our profession. We will first open it up to the class and will call on random students to state 1) one thing they liked and/or thought was effective and 2) one thing that could be improved. Be kind and respectful in the feedback. We all want each other to succeed and improve so try your best to be constructive. **Any disrespectful or hateful comments will not be tolerated.**

Relevant Reading:

Each module will be provided with assigned papers and relevant reading materials to provide additional background. Use those resources and the textbooks below to give yourself a starting point as you begin building your presentation.

Module 1: Cell biology

- [Essential Cell Biology](#), 5th Edition, Alberts et al.

Module 2: Developmental biology

- [Molecular Biology of the Cell](#) (MBoC, Alberts B, Johnson A, Lewis J, et al. New York: Garland Science; 2002.), Chapter 21.
- [Kandel](#) et al., Principles of Neural Science, Sixth edition, Chapters 45-51. (*Available online through the library - Search HOLLIS.*)

Module 3: Neurobiology

- [Kandel](#) et al., Principles of Neural Science, Chapters 1,3, 13, 15, 22, 33, and 34. Follow [hyperlink](#).
- Lignon Luo, [Principles of Neurobiology](#), Chapter 10.

Writing Component | NIH F31 Grant

A key focus of MCB292 is scientific communication and grant writing. The course will contain a series of writing and proposal-related presentation assignments, culminating in writing the core components of an NIH F31 grant. Mentoring and writing help will be provided by the instructors and Tien.

Important Due Dates (submission links for each assignment are linked below):

- [9/7: Biosketch due](#)
- [10/3: Aims draft 1 due](#)
- [10/24: Aims draft 2 due](#)
- [10/31: Abstract due](#)
- [11/14: Full proposal draft 1 due](#)
- [11/27: Full proposal draft 2 due](#)
- [12/7: Final full proposal due](#)

Refer to the [Grant Writing Expectations and Overview](#) for complete instructions.

Assignment Submission using Canvas:

All assignments should be submitted on Canvas. You can find the submission link for each under "Assignments" Please upload as a .docx file (you can export a file in .docx format from Google Docs if needed).

Expectations

Expectations for Presenters:

It is **required** to meet with the primary faculty for 10-15 minutes to discuss your presentation **before** your coaching session. This can be either before or after class. If you are struggling with the topic or want feedback in your presentation design, it is highly encouraged to set up a meeting with the faculty. They

are experts in their fields and will support you!!! It is okay to need help! We understand that some of these topics are very new to you so we will provide any assistance and clarification needed.

You must come to the coaching session **prepared**. Your slides must have been thought out and populated. Your verbal presentation does not need to be perfect or rehearsed but come with an idea of what you want to say.

Have fun with it! Every presenter has their own style and each presentation can have its own flair. Use this opportunity to try out different styles and see what works for you. You should, of course, be very prepared by the time you present to the class.

Arrive 5-10 minutes early to set up presentations.

Expectations for Audience:

Read the papers and/or relevant background before each class. Engage with the presenter. Ask questions. Answer questions. Offer opinions. No one enjoys being a presenter with a disengaged, disinterested audience.

Be respectful to the presenters. The bare minimum is giving the presenter your attention.

We expect you to ask questions to the speakers and give them feedback. Activity listen to their talks so you can do both.
When giving feedback, be constructive.

Attendance and punctuality will be graded.

Please reach out to Tien if you are unable to attend class or will be coming late.

Expectations for F31-like Proposal:

Be mindful of how you manage your time. This is good practice when you all eventually submit your own F31 or NSF proposals. Tien will send reminders of key deadlines.

Submit all portions on time. A big part of writing a successful proposal is getting feedback. If you submit your portions late, we will not be able to give feedback to help you revise your proposal. Points will be deducted for late submissions.

Grading

- Specific Aims 10% (5% written and 5% oral)
- Final Proposal 20%
- Lecture Presentation 20% (5% being prepared for coaching sessions)
- Paper Presentation 20% (5% being prepared for coaching sessions)
- Short format pitch 5%
- Class participation 25%

Accommodations for Students with Disabilities

Students needing academic adjustments or accommodations because of a documented disability must present their Faculty Letter from the [Disability Access Office \(DAO\)](#), formerly the Accessible Education Office (AEO), and speak with the professor by the end of the second week of the term. Failure to do so may result in the Course Head's inability to respond in a timely manner. All discussions will remain confidential, although Faculty are invited to contact AEO to discuss appropriate implementation.

Course Schedule

--	--	--	--	--	--

Date	Faculty lead	Student presenters	Presentation Type	Topic	Proposal Assignments Due
Sep. 5	All		Lecture	Introduction to the course	
Sep. 7	Garner		Faculty lecture	Cell bio: introduction to cell biology	Biosketch
Sep. 12	Sanes		Faculty lecture	How to write a grant	
Sep. 14	Garner	Alex Wesley	Paper (Cell 1)	Cell bio: Reading out long-range spatial information	
Sep. 19	Garner	Fardin Myrthe	Lecture (Cell 2)	Cell bio: Size control	
Sep. 21	Garner	Eric Deets	Paper (Cell 3)	Cell bio: Signaling across space and time	
Sep. 26	Garner	Haoxuan Claire	Lecture (Cell 4)	Cell bio: Phase transitions	
Sep. 28	Garner	Isra Adam	Paper/Lecture (Cell 5)	Cell bio: Cytoskeletal organization	
Oct 3	Sanes		Faculty lecture	Dev bio: Introduction to developmental biology	Specific aims (first draft)
Oct. 5	Sanes	Minseon Arshia	Paper/Lecture (Dev 1)	Dev bio: Positional information	
Oct 10	Sanes	Katia Eric	Lecture (Dev 2)	Dev bio: Multipotentiality	
Oct. 12	All		"chalk talks"	Introduce and defend your specific aims (day 1)	
Oct. 17	All		"chalk talks"	Introduce and defend your specific aims (day 2)	
Oct. 19	All		"chalk talks"	Introduce and defend your specific aims (day 3)	

Oct. 24	Sanes	Hisham Myrthe	Lecture/Paper (Dev 3)	Dev bio: Organoids and chimeras	Specific aims due (second draft)
Oct. 26	Sanes	Noah Claire	Lecture/Paper (Dev 4)	Dev bio: Wiring up the nervous system	
Oct 31	All		Short pitches	Short format pitches	Abstract
Nov 2	Murthy		Faculty lecture	Neuro: Intro to neurobiology	
Nov 7	Murthy	Isra Noah	Lecture/Paper (Neuro 1)	Neuro: Electrical properties of neurons	
Nov. 9	Murthy	Adam Deets	Paper/Lecture (Neuro 2)	Neuro: Synaptic physiology	
Nov. 14	Murthy	Arshia Minseon	Paper/Lecture (Neuro 3)	Neuro: Synaptic plasticity	Full proposal due (first draft)
Nov. 16	Murthy	Fardin Alex	Paper/Lecture (Neuro 4)	Neuro: Visual processing	
Nov 21	Murthy	Haoxuan Wesley	Paper/Lecture (Neuro 5)	Neuro: Motor Control and Behavior	
Nov. 23	No Class			Thanksgiving. Enjoy your time off	
Nov 27th	No Class				Second draft of proposal due. HARD DEADLINE. Submit by noon!
Nov 28	Sanes	Katia Hisham	Paper (Dev 5)	Ethics	
Nov 30	All			Mock study sections I	
Dec. 5	All			Mock study sections II	

Dec. 7					Final proposal due
--------	--	--	--	--	------------------------------------