

BI328 Developmental Biology Syllabus

Class discussions/lectures: Room - 141 ALL

Tues/Thurs, 1000-1120

Zoom link: TBD

Recorded content to view before class can be found in each Module.

Recorded *post*-discussion content associated with each meeting can be found in each Module.

Passcode for recorded content above:

bi328devbio!

Lab: Room - 33 KLA

Wed, 1200-1350, Zoom link: TBD

Wed, 1400-1550, Zoom link: TBD

Wed, 1600-1750, Zoom link: TBD

Instructors

Dr. Adam Miller - [email](#)

Office hours: Mon, 1400-1500 + by request (send email with Bi328 in Subject)

Zoom link: TBD

William Crow - [email](#)

Office hours: TBD

Zoom link: TBD

Sophia Doerr - [email](#)

Office hours: TBD

Zoom link: TBD

Katie Perez – lab preparator

Course description

This course will explore mechanisms underlying animal development, drawing on examples from different organisms to illustrate basic principles of cellular, molecular, and activity-dependent mechanisms that contribute to creating complex, multicellular organisms. The course will emphasize conceptual understanding of the topic and critical thinking. Broad topics of consideration will range from fertilization, to initial patterning and cellular differentiation, to organogenesis, with developmental disorders explored throughout for context.

In addition, there is a companion lab component. The main goals of the lab are to explore concepts relevant to the course and develop a sense of scientific inquiry. Throughout lab you will develop bench skills to investigate developmental biology and develop an independent research project that builds a hypothesis and tests it with experiments in lab. Finally, you will work on scientific communication skills and will present your work.

Learning objectives

- Gain an understanding of mechanisms underlying development, including similarities and differences between different animal taxa;
- Explore how alterations in some aspects of development can result in human developmental disorders and the importance of animal research for elucidating underlying mechanisms;
- Become acquainted with reading, discussing, and examining primary research literature and critically evaluating data;
- Create a framework of understanding that goes beyond memorization to conceptual understanding of the scientific process;
- Develop the ability to formulate hypotheses about the mechanistic bases for biological phenomena;
- Become acquainted with designing experimental strategies to test hypotheses about the mechanistic bases for biological phenomena;
- Develop skills in presenting scientific ideas in written and oral formats.

Course schedule (*tentative – see Modules for each week's materials*)

1	Tues	Lecture	Overview of Development - differentiation
	Wed	no lab	
	Thurs	Lecture	Differentiation determinants
2	Tues	Lecture	Its all about Mom - maternal-zygotic transition
	Wed	Lab	Introduction to zebrafish and microscopy I
	Thurs	Lecture	Breaking symmetry - dorsal/ventral axis
3	Tues	Lecture	Gastrulation - anterior/posterior axis
	Wed	Lab	Introduction to RNA in situ and microscopy II

	Thurs	Lecture	The final turn - left/right axis
4	Tues	Exam	Exam I
	Wed	Lab	Introduction to scRNAseq and data analysis
	Thurs	Lecture	Making a brain - neural tube development
5	Tues	Lecture	Billions and billions - neural stem cells
	Wed	Lab	Hypothesis building and image analysis
	Thurs	Lecture	Neural circuits - how to read a paper
6	Tues	Lecture	Not bound by its origin - neural crest
	Wed	Lab	Independent experiments I
	Thurs	Lecture	Super strong - the clock is ticking on the mesoderm
7	Tues	Lecture	Its guts all the way down - all about the endoderm
	Wed	Lab	Independent experiments II
	Thurs	Lecture	You are mostly not you - microbiome
8	Tues	Exam	Exam II
	Wed	Lab	How to present your work

	Thurs	Lecture	EvoDevo - understanding the past through bones
9	Tues	Lecture	More plastic than you think - sexual differentiation
	Wed	Lab	Research Project Presentations I
	Thurs	Lecture	Sex cells - its all about the next generation
10	Tues	Lecture	New frontiers - making a brain in a dish I
	Wed	Lab	Research Project Presentations II
	Thurs	Lecture	New frontiers - making a brain in a dish II
11	TBD	Final	Final ***for date and time, check final schedule online***

Course materials

Course organization is handled through Canvas. **EACH CLASS** will have relevant lecture and reading materials posted before class. In class, we will discuss and extend these concepts. **BEFORE CLASS** you will need to watch and read the day's material - there will be in class activities that require you have read the materials, e.g. quizzes.

Reading

We will use the below textbook. While it is not required, it is recommended. Having another perspective on the discussed topics is very useful for understanding the material.

Developmental Biology, 11th Edition, Gilbert and Barresi

- Available in the science library, critical supplement to class.
- Relevant sections posted on Canvas in the "Readings" section.

*** You can find free, older versions of this online. I will post notes on the general topics of interest, and you can track down the relevant sections in other books.

- Additional readings posted on Canvas in the "Readings" section.

Lectures

- Recorded lecture material necessary for each class will be posted before class in the

relevant module.

- Recordings of the classes will be posted to Canvas.
- Slides of the lectures will be posted on Canvas.

Labs

Labs are a required part of the course. This is a lecture and lab course, and to receive full points for the course, you have to participate in both portions.

- Lab Materials will be posted on Canvas. **Each Lab will have its own dedicated Canvas page - be sure to find yours as you will need to use it.** Materials will be posted by Friday the week prior to class.
- PreLab questions are due, on Canvas, *before* lab starts.
- Lab attendance is not required given the pandemic. We all must stay home when we are sick. However, there is no work that actually substitutes for lab work. Thus there are two things we strive for this year: (1) be in lab (2) only when you are healthy. We will find accommodations, but show up to lab when you are feeling well because it is critical to learning.
- PostLab Assignments are due, on Canvas, *before* the next week's lab starts.

Grading policy

- Final grades will be based on scores in Final (25%), Exam (25%), Participation (15%), Labs (25%), Research Project Presentation (10%).
- All work must be your own, original work. Anything less will result in a fail and reporting via the UO ethics code.
- Much of the work will occur in groups. However, *what you turn in has to be your own.* Please do work together to understand the concepts. But you will turn in work that is your own. Anything less will result in a fail and reporting via the UO ethics code.

Two exams

- The **exams** will focus on the material of lectures presented in the lectures preceding the exam (see Course Timeline). However, the nature of the course is to build on concepts, so the second exam will build on previous concepts.
- For the exam portion of the grade, **only the best exam score of the two** will be counted. In other words, the exam with the lowest score will be dropped. This allows for flexibility if an exam must be missed.
- An exam will be worth *approximately* 150 points (the exact number will depend on the number and types of questions). They will consist of a mix of multiple choice, fill in the blank, short answer questions, and critical readings and interpretations of primary literature papers/figures.

Point recovery on exams

- You can earn up to 25% of your missed points back on your exam. To receive *any* points you *must meet a high bar*. You will only receive full points back if you follow all of the instructions below. **If you do not follow *all* of the below instructions, I will not evaluate the document, and you will receive no points.**

1. You must put your full name on each page of the document.
2. You must address *every* mistake you made in the exam.
3. You must copy the question itself onto your document (text color black).
4. You must copy your incorrect answer onto the document (text color blue).
5. You must state the correct answer. Your statement must clearly discuss what led you to your misunderstanding (text color black).
6. You must then write a response as to why it is the correct answer. This must demonstrate your understanding of the concept. (text color red)
7. You must save the file as a pdf and the file name must be in the format: **lastName_firstName_examXmakeup.pdf** and you must write in *your names* for “lastName” and “firstName” and also write in the appropriate exam number for “X”.
8. You must submit your response to Canvas, and it must be received by 11:59pm by the specified date or it will not count.

Final

- The **final** will cover topics and lectures from the entire course, although many questions will focus on the final topics/weeks covered in the class after the 2nd exam. It will occur during final’s week on the date as stated on this site: <http://classes.uoregon.edu/Links to an external site.> and more information can be found at: <https://registrar.uoregon.edu/calendars/examinations#complete-final-exam-scheduleLinks to an external site.>
- The **final must be taken** and will count towards the final grade.
- The final will be worth *approximately* 200 points (the exact number will depend on the number and types of questions). It will consist of a mix of multiple choice, fill in the blank, short answer questions, and critical readings and interpretations of primary literature papers/figures.
- **Make-up exams/final can not be offered.**

Participation

The main goal is to create a learning environment that challenges the students to better learn the material. Critical to this effort will be lecture activities that will serve two main purposes: (1) engage all those taking the course and provide opportunities for problem solving, peer discussion, and higher-level synthesis, (2) develop understanding of how science is presented (i.e. reading and breaking down primary literature); and (3) provide examples of previous test questions to aid in exam preparation. These activities will take various forms throughout the course. In addition, lab participation is critical to this course. Receiving an introduction into scientific exploration and experimentation is a key piece of this course, and the only way to gain such knowledge is to participated.

Labs

Participation

- You must be present in lab to receive points for assignments related to that week.

- Due to timing constraints, no makeup labs are available. To accommodate any issues that might arise throughout the term, full credit for labs comes from your best n-1 scores. That is, you can miss one lab (or do poorly on one lab) and still receive full credit.
- Given the challenges of the pandemic, we will assess accommodations for absences on a one-on-one basis. NOTE - DO NOT COME TO CLASS IF YOU ARE SICK.
- Labs consist of three parts: 1) PreLab questions, 2) Participating in the lab, 3) turning in a PostLab report.
- **You must do your own work on all turned in portions of your labs.** Anything less will be a fail.
- **You must be prepared and read to work when you get to Lab. Do the reading ahead of time.**

PreLab Questions

Before each lab there will be PreLab questions and answers must be submitted on Canvas *before* your lab section begins.

Lab Participation

Each lab will have specific tasks. You must be present to achieve the goals.

PostLab Report

Each PostLab Report will require you to report on your previous weeks activities.

Research Project Presentation

Through the lab you will develop an independent research project. At the end of the term, you will present your overarching ideas and your results in a final presentation. Details can be found in the Lab Manual and the project will develop over the entire term.

No early exams or labs can be given for this course.

No makeup exams or labs can be given for this course.

Accommodations

If you have medically valid reasons and need accommodations for the term, please get in touch with the [AEC](#). [Links to an external site.](#) In addition, please discuss this with me within the first week of the course in whatever manner is most comfortable for you.

PANDEMIC - it is critically we keep one another healthy in these times. UO policies related to COVID will be followed. Accommodations due to health challenges will be made. If you are sick, stay home. The materials will be available online. In class we will have the chance to really test and expand our competency with the materials - this will be recorded and made available. Office hours can help supplement missed material. The key is to push yourself in the class, but keep your health and others in mind. We can find the right solutions for everyone and learn a lot together.

COVID

As the University of Oregon returns to in-person instruction, the key to keeping our community healthy and safe involves **prevention, containment, and support**. Here is information critical to how the UO is responding to COVID-19.

- **Prevention:** To prevent or reduce the spread of COVID-19 in classrooms and on campus, all students and employees:
 1. Must comply with [vaccination policy](#) *Links to an external site.*
 2. Must [wear face coverings](#) *Links to an external site.* in all indoor spaces on UO campus
 3. Complete weekly [testing](#) *Links to an external site.* if not fully vaccinated or exempted
 4. [Wash hands](#) *Links to an external site.* frequently and practice social distancing when possible
 5. Complete daily [self-checks](#) *Links to an external site.*
 6. Stay home/do not come to campus if feeling [symptomatic](#) *Links to an external site.*
 7. Complete the UO [COVID-19 case and contact reporting form \(Links to an external site.\)](#) if you test positive or have been in close contact with a confirmed or presumptive case.
- **Containment:** If a student in class tests positive for COVID-19, all relevant classes will be notified via an email by the Corona Corps Care Team with instructions for students and staff based on their vaccination status. Specifically:
 1. **Vaccinated and Asymptomatic students:** Quarantine not required, but daily self-monitoring before coming on campus is advised; sign up for testing through MAP 3-5 days after exposure if advised you are a contact.”
 2. **Unvaccinated or partially vaccinated students:** 14-day quarantine advised – do not come to class – and sign up for testing 3-5 days after notification through [MAP](#) *Links to an external site.*, if asymptomatic, or through University Health Services (541-346-2770) or your primary care provider, if symptomatic.
 3. **Symptomatic students:** stay home (do not come to class/campus), complete the online [case and contact form \(Links to an external site.\)](#), and contact University Health Services (541-346-2770) or your primary care provide to arrange for immediate COVID-19 testing.

Students identified as a **close contacts** of a positive case will be contacted by the Corona Corps Care Team (541-346-2292).

- **Support:** The following resources are available to you as a student.
 - [University Health Services](#) *Links to an external site.* or call (541) 346-2770
 - [University Counseling Center](#) *Links to an external site.* or call (541) 346-3277 or (541) 346-3227 (after hrs.)

- [MAP Covid-19 Testing](#) [Links to an external site.](#)
- [Corona Corps](#) [Links to an external site.](#) or call (541) 346-2292
- [Academic Advising](#) [Links to an external site.](#) or call (541) 346-3211
- [Dean of Students](#) [Links to an external site.](#) or call (541)-346-3216

Good Classroom Citizenship

- Wear your **mask** and make sure it fits you well
- **Stay home** if you're sick
- **Get to know your neighbors** in class, and let them know if you test positive
- **Get tested** regularly
- Watch for **signs and symptoms** with the daily symptom self-check
- **Wash your hands** frequently or use hand sanitizer

Complete the UO COVID-19 [case and contact reporting form](#) ([Links to an external site.](#)) if you test positive or are a close contact of someone who tests positive.

Class conduct

Class starts promptly at the time set in the schedule and we will proceed for approximately 1 hour with time interaction and for Q&A. Lab starts promptly at the designated time of your section and we will work on papers throughout. Please arrive on time and do not pack up before the conclusion of class. Arriving late and leaving early is disruptive to others around you and to the speaker. Do not talk during lecture in a volume audible to anyone but the intended recipient. Do not use electronic devices for non-class purposes. **In particular, silence your devices and be respectful to everyone in the course.**

Open inquiry, freedom of expression, and respect for difference are fundamental to a comprehensive and dynamic education. We are committed to upholding these ideals by encouraging the exploration, engagement, and expression of divergent perspectives and diverse identities. Classroom courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, culture, religion, politics, sexual orientation, gender, gender variance, and nationalities. Our classroom is a learning environment, and as such should be a safe, inclusive and respectful place.

Academic Integrity

The University Student Conduct Code (available at [conduct.uoregon.edu](#) [Links to an external site.](#)) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify

the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at <https://researchguides.uoregon.edu/citing-plagiarism> [Links to an external site.](#)

Inclusiveness

UO is working to create inclusive learning environments. Please notify me if there are aspects of instruction or design of this course that result in barriers to your participation. You may also wish to contact the Accessible Education Center (541-346-1155; usaec@uoregon.edu, [Accessible Education Center](#) [Links to an external site.](#)).

Campus resources to support your learning

Tutoring and Academic Engagement Center (<https://engage.uoregon.edu/services/> [Links to an external site.](#)) Drop-in math and writing support in addition to tutoring, study skills support, and Class Encore. Located in the 4th Floor Knight Library (541) 346-3226, engage@uoregon.edu.

Counseling Center Call anytime to speak with a therapist who can provide support and connect you with resources. Located on the 2nd Floor of the Health Center (541) 346-3227

Accessible Education Center The University of Oregon is working to create inclusive learning environments. The instructor believes strongly in creating inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your participation, please notify us as soon as possible. You are also encouraged to contact the Accessible Education Center. If you are not a student with a documented disability, but you would like for us to know about class issues that will impact your ability to learn, we encourage you to come visit during office hours so that we can strategize how you can get the most out of this course. Located on the 1st Floor of Oregon Hall (541) 346-1155, uoaec@uoregon.edu.

Center for Multicultural Academic Excellence (CMAE) mission is to promote student retention and persistence for historically underrepresented and underserved populations. We develop and implement programs and services that support retention, academic excellence, and success at the UO and beyond. We reaffirm our commitment to all students, including undocumented and tuition equity students. Located on the 1st Floor of Oregon Hall (541) 346-3479, cmae@uoregon.edu.

The *UO Access Shuttle* is an on-campus ride service provided at no cost to students with conditions that limit mobility. More information and a sign-up form can be found on the parking & transportation department website: <https://parking.uoregon.edu/content/access-shuttle> [Links to an external site.](#)

Discrimination and Harassment

Prohibited Discrimination and Harassment

Any student who has experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu [Links to an external site.](#) To get help by phone, a student can also call either the UO's 24-hour hotline at 541-346-7244 [SAFE], or the non-confidential Title IX

Coordinator at 541-346-8136. From the SAFE website, students may also connect to Callisto, a confidential, third-party reporting site that is not a part of the university. Students experiencing any other form of prohibited discrimination or harassment can find information at respect.uoregon.edu[Links to an external site.](#) or aaeo.uoregon.edu[Links to an external site.](#) or contact the non-confidential AAEO office at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help. As UO policy has different reporting requirements based on the nature of the reported harassment or discrimination, additional information about reporting requirements for discrimination or harassment unrelated to sexual assault, relationship violence, sex or gender based bullying, stalking, and/or sexual harassment is available at [Discrimination & Harassment](#)[Links to an external site.](#).

Reporting

The instructor of this class is a Student-Directed Employee. As such, if you disclose to me, I will respond to you with respect and kindness. I will listen to you and will be sensitive to your needs and desires. I will not judge you. I will support you. As part of that support, I will direct students who disclose sexual harassment or sexual violence to resources that can help. I will only report the information shared to the university administration when you as the student requests that the information be reported (unless someone is in imminent risk of serious harm or is a minor). Please note the difference between 'privacy' and 'confidentiality.' As a Student-Directed Employee I can offer privacy because I am not required to report certain information to the university. However, I cannot be bound by confidentiality as is the case with a counselor or attorney. Confidential resources mean that information shared is protected by federal and state laws. Any information that I as a student-directed employee receive may still be accessed by university or court proceedings. This means, for example, that I could still be called as a witness or required to turn over any related documents or notes that I keep.

Please note also that I am required to report all other forms of prohibited discrimination or harassment to the university administration. Specific details about confidentiality of information and reporting obligations of employees can be found at titleix.uoregon.edu[Links to an external site.](#).

Mandatory Reporting of Child Abuse

UO employees, including faculty, staff, and GEs, are mandatory reporters of child abuse. Child abuse pertains to individuals who are under the age of 18. This statement is to advise you that your disclosure of information about child abuse to the instructor may trigger my duty to report that information to the designated authorities. Please refer to the following links for detailed information about mandatory reporting: [Mandatory Reporting of Child Abuse and Neglect](#)[Links to an external site.](#).

Safe Ride

541-346-7433 ext 2

pages.uoregon.edu/saferide[Links to an external site.](#)

Safe Ride is an assault prevention shuttle that works to provide free, inclusive, and accessible alternatives to traveling alone at night for UO students, faculty, and staff.

We are a schedule-ahead service and riders can (1) call once we open to schedule a ride with a dispatcher or (2) leave a voicemail on the day of their ride request. We do not call riders ahead of time to confirm due to capacity constraints, but riders are always welcome to call us to double-check that their ride was scheduled. We are a feminist, 'for-the-students/by-the-students' organization and operate out of the Women's Center in EMU 12F.