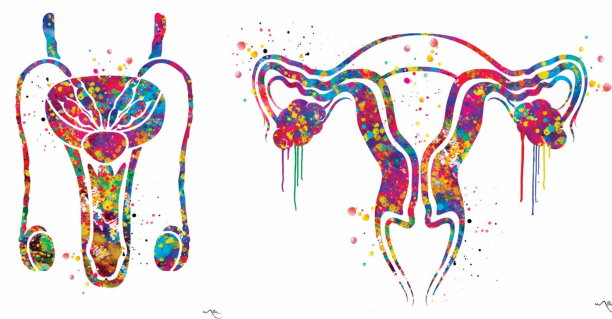


REPRODUCTIVE BIOLOGY

SCRB 135 | SPRING 2024



INSTRUCTOR

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TEACHING FELLOWS

Henry Bushnell (he/him)

PhD candidate, Developmental and Regenerative Biology

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Kiwi Florido (she/her)

PhD candidate, Biological Sciences in Public Health

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TEXTBOOK

There is no one textbook that covers all topics in the class. Course discussions will draw from current papers in the field.

The following books are recommended, not required:

1. Williams Textbook of Endocrinology, 14th edition.
2. Langman's Medical Embryology

The e-books can be found in the Harvard Library Course Reserves (listed under course Canvas site).



CLASS MEETINGS

Monday and Wednesday 9:00 – 10:15 am

Sherman Fairchild G62

Class begins promptly at 9:00

COURSE CANVAS PAGE

<https://canvas.harvard.edu/courses/129918>

STUDENTS ARE GRADED ON:

In-class participation	20%
Problem sets	45%
Response paragraphs	5%
Written research proposal	20%
Oral presentation of research proposal	10%

PREREQUISITES

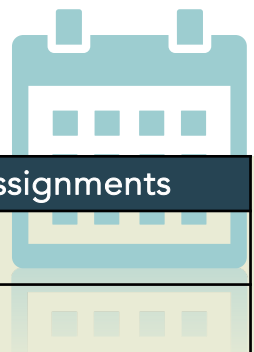
LS1a/b, LS50 or LPSA
SCRB 10, and SCRБ 50 or MCB 60

COURSE OBJECTIVES

The overall goal of this course is to improve knowledge and skills along 3 axes:

- 1) **Develop fluency with key concepts in reproductive biology**
 - a. to expand knowledge of development, functions, and diseases of the reproductive tracts with a particular focus on humans and other mammals
 - b. to encourage curiosity and interest in topics surrounding reproductive health
 - c. to understand the intersections between reproductive biology and society
- 2) **Build skills and confidence with data interpretation and experimental design:**
 - a. to expand understanding of data interpretation (how do we know what we know?)
 - b. to develop the ability to design experiments that rigorously test ideas and hypotheses (how do we answer questions we don't know the answer to yet?)
- 3) **Develop communication skills and confidence in oral and written formats**

Course Schedule



Day	Date	Module	Lecture	Assignments
M	1/22	Development	Introduction to the course Introduction to hormones	
W	1/24		Hormones continued, techniques bootcamp	
F	1/26			
M	1/29		The gonads; techniques bootcamp 2	
W	1/31		Ducts and genitalia	Journal club paper assigned, fishbowl list assigned Practice problem set assigned
F	2/2			
M	2/5		Paper discussion 1	
W	2/7		Fishbowl 1 and building a hypothesis and specific aims Guest lecturer: Henry Bushnell	Practice pset due Optional section: problem solving
F	2/9			Problem set 1 assigned
M	2/12	The HPG axis	The HPG axis	
W	2/14		Puberty	
F	2/16			Problem set 1 due
M	2/19		PRESIDENT'S DAY	
W	2/21		HPG dysfunction (infertility 1)	Response paragraphs assigned, fishbowl list assigned Practice problem set assigned
F	2/23			
M	2/26		HPG dysfunction (infertility 2)	
W	2/28		Fishbowl 2 and Ethics 1: Trans and intersex medicine – Guest lecturers: Dr. Louise Perkins King and Dr. Frances Grimstad	Response paragraphs due before class. Practice problem set due Optional section: problem solving
F	3/1			Problem set 2 assigned
M	3/4		Studying sex variable biology Guest lecture: Dr. Simón(e) Sun	
W	3/6		Menopause	Fishbowl list and ethics assigned
F	3/8			Problem set 2 due



Day	Date	Module	Lecture	Assignments
SPRING BREAK				
M	3/18	Reproductive health	The vaginal microbiome Guest lecturer: Dr. Smita Gopinath	Research proposal summary assigned
W	3/20		Sex chromosomes beyond reproduction Guest lecturer: Dr. David Page	Ethics response due
F	3/22			
M	3/25		Grant workshop 1	Research proposal summary draft 1 due before class
W	3/27		Menstruation and benign gyn	
F	3/29			
M	4/1		Pregnancy	
W	4/3		Ethics 2: gestational carriers Guest lecturer: Dr. Louise Perkins King 8-8:45 AM on Zoom	Hypothesis and specific aims approval deadline
F	4/5			Problem set 3 assigned
M	4/8		Paper discussion 2	Practice talks
W	4/10		Fishbowl 4 and ethics 3: abortion Guest lecturer: Dr. Louise Perkins King	Practice talks
F	4/12			Problem set 3 due
M	4/15		Reproductive cancers	Practice talks
W	4/17		Student presentations	Practice talks
F	4/19			Practice talks
M	4/22		Student presentations	
W	4/24		Student presentations	
W	5/1			Final project (research proposal) due



Participation

EXPECTATIONS FOR PARTICIPATION

You will have numerous opportunities to participate in every lecture. In addition, there are 3 types of classes that are particularly focused on discussion, marked in purple on the syllabus.

1. Paper discussions
2. Reproductive ethics
3. Days that incorporate a game of fishbowl to build fluency in key concepts

Attendance is mandatory on these days to receive full participation points (see attendance and absences policy).

We understand that speaking up in class can be challenging, and have created the following opportunities to help you feel comfortable speaking in class:

1. For paper discussions, there will be ample opportunities for discussion in small groups before discussing with the whole class.
2. For fishbowl, as described below, you can prepare ahead of time if you wish.
3. For each ethics discussion, there will be reading assigned ahead of time, so you may choose to come with questions prepared if this makes you more comfortable.
4. If you are concerned whether you are doing "enough" on participation, feel free to check in with the instructors. If we see room for improvement in your participation once the semester is in full swing, we will also reach out to you individually.

During **PAPER DISCUSSIONS** (occurring during lecture) students will work collaboratively and present their conclusions orally:

SESSION 1:

The first paper discussion is a journal club focused on data interpretation. The paper will be assigned on Wednesday along with a list of questions for you to consider, for journal club the following Monday. You are expected to read the paper and consider the questions ahead of time. During the class time, you will be grouped together in small groups and assigned one of the questions to discuss in detail. The class will then come together and each group will report their conclusions. Everyone should speak over the course of the whole class discussion.

SESSION 2:

The second paper discussions is about experimental design. You do not need to prepare ahead of time but will utilize your knowledge gained from class to design experiments. The class will be separated into small groups and each group will be given an abstract. Each group will discuss the experiments they would do to support the claims in the abstract before joining a broader discussion with the class.

FISHBOWL:

Throughout the semester we will play the game "fishbowl" to help build fluency with key terms and concepts for the class. Briefly, many slips of papers with key concepts and terms from the previous classes are put in a bowl and the class is split into two teams. Each person draws a slip from the bowl, one after another, and has to give clues to help their team guess what is on the slip.

We will provide a list of the terms and concepts that will be in the fishbowl ahead of time for you to study. The game is designed to further solidify your memory of these concepts. Once you take a slip from the bowl, you have to describe it (i.e. you cannot "pass").

Research Proposal

EXPECTATIONS FOR PROPOSAL

The final project is a written research proposal that outlines the approach to test a new hypothesis related to any topic that is covered during the course. The goal is to allow you to follow your curiosity around a concept of your choosing to design experiments to test the hypothesis.

Receiving and responding to feedback is a critical part of being a scientist, and we want to give you opportunities to build the best proposal you can. Therefore, you will turn in a draft summary of your hypothesis and specific aims and receive feedback from the TFs (+ 3 bonus TFs!) in a grant workshop during class time. The TFs will also give feedback on a practice presentation.

The proposal should be 3-4 pages single spaced, 1-inch margins, 12 pt font (Arial):

- 0.5 page summary (hypothesis and specific aims)
- 1-2 pages background and significance
- 2 pages for experimental approach including caveats, and alternative approaches
- 1 page for conclusion and future directions
- Works cited and figures do not count toward page limit

In addition to the written final project, due on May 1st, you will also give a short oral presentation to the class on your topic background, hypothesis and specific aims.

Problem Sets & Response Paragraphs

PROBLEM SETS

RESPONSE PARAGRAPHS

Response paragraphs are designed to help you think creatively about (1) lecture material to prepare you for your grant proposal and (2) about questions in reproductive ethics.

For each assignment you will be asked to write two response paragraphs: one in response to the lecture material, and one in response to readings about the topic of the upcoming ethics session.

You will work independently on these paragraphs in consultation with written resources.

Your paragraph should be at least 1/2 pages but not longer than 1.5 pages, double spaced, 1-inch margins, 12 pt font (Arial).

Problem sets are designed to help solidify or enrich concepts from lecture focusing on data interpretation and experimental design. You will work independently in consultation with written resources and present your conclusions in writing. You may not consult or collaborate with other people (class members, your lab members, other faculty/instructors, your family, etc.) but you may bring questions for the TF or professor during office hours. See academic integrity and collaboration policy.

Problem sets are assigned on Fridays and cover material including the Monday lecture that week. You will have one week to work on them. Grades will be returned and keys posted the Friday after the problem set due date.

PRACTICE PROBLEM SETS

To provide additional problem solving practice ahead of the graded problem set, we will post practice problem sets at least one week before the graded problem set is assigned. These will be discussed in the optional section. Taking a stab at the practice problem sets before you see the answers will really help you! Therefore, you are encouraged to attempt each practice problem set and turn it in before the section meets. For each practice problem set you turn in on time, you will receive 3% extra credit on your total grade.

Course Logistics

Attendance & Absences

Attendance at class is required and incorporated into the participation grade. If you are sick, you may attend class virtually. Please email the instructors as soon as possible (at least 30 minutes before class begins) and they will arrange for you to participate virtually. Please email the instructors at least 30 minutes before class begins if you are sick and unable to attend class virtually.

Participation in classes marked purple on the syllabus is a key component of the participation grade. These classes will not be accessible virtually. If you will be unable to participate due to a scheduled event (e.g. athletic travel) or unanticipated event (e.g. illness, family emergency), you will make up the missed class at a later date or lose participation points. You must inform the instructors at least 30 minutes before class begins.

Inclusivity

This class strives to be an inclusive community, learning from the many perspectives that come from different backgrounds and beliefs. As a community, we aim to be respectful to all, regardless of race, ethnicity, religion, gender or sexual orientation. We expect that members of the teaching team and students will create an environment that facilitates inquiry and self expression, while also demonstrating diligence in understanding how others' viewpoints may be different from their own. This course inevitably covers sex-associated variables including karyotype, gonads, gametes, and genitalia. Our goal is always to discuss these concepts using gender-inclusive language (e.g. menstruators, pregnant people, people with testes etc.). There may be times when we fall short of this goal, and you should feel empowered to bring this up with us either during lecture/discussion or privately.

Ethics Discussions

This course will cover several topics for which different people in the class may have different opinions. Respectful discussion is a core tenet of this class, and disrespectful treatment of your colleagues will affect your participation grade.

Late Work Policy

Late work will be deducted 10% of the total score per day late (up until the day at which the answers are posted on Canvas. No credit will be given after this point). Extensions are rarely granted except for medical emergencies with proper documentation.

Academic Integrity: Collaboration & AI Policy

All written work submitted must be the student's own. Students may **not** discuss answers or work with others on problem sets. Students may not copy writings or diagrams from textbooks, journals or laboratory protocols without proper citations. Cheating on problem sets, plagiarizing or misrepresenting the ideas or language of someone else as one's own, or any other instance of academic dishonesty violates the standards of our community.

We support the use of generative AI e.g. ChatGPT for generating first drafts of final projects but expect students to review and refine their proposal afterwards, being aware of the possibility for inaccuracies. Students will be asked to include a statement about their use of such tools alongside the final project.

For guidelines on how to properly cite work, please see:

http://projects.iq.harvard.edu/files/lifesci/files/guide_to_citing_in_the_life_sciences.pdf

For resources and guidelines on academic honesty, please see: <http://honor.fas.harvard.edu>

Accommodations for Students with Disabilities

Students needing academic adjustments or accommodations because of a documented disability must present a letter from the [Disability Access Office \(DAO\)](#) and speak with the instructor by the end of the second week of the term. Failure to do so may result in the instructor's inability to respond in a timely manner. All discussions will remain confidential (instructor will contact DAO to discuss appropriate implementation).