

## BIOL 105L: Biology Research Skills

I'm excited to work with you this semester!

### Frequently Asked Questions / Quick Links:

- How do I get in touch with Dr. Hastie ([ehastie@email.unc.edu](mailto:ehastie@email.unc.edu))? Email me (email template) or come hang out in office hours (TBD in Wilson 235)! If my office hours don't work, please email me three times that work for you. \*Note, please do not email any professor with an email that starts with "Hey!" Time to be professional!
- What do I need to buy for this course? **Nothing! We will use primary literature and online materials.**
- How do I fix an issue with Canvas? **Tech Support (The help button is on the left <--look over there!) First thing, make sure you are getting the Canvas announcements in your email!**
- Where and when is class? **Class will be held on Zoom on Mondays ([LINK](#)**

[Links to an external site.](#)) OR Wednesdays ([LINK](#)

- [Links to an external site.](#)) from 12:20 - 1:10 p.m. (this depends on your section - you must attend at the time on your schedule to receive credit AND your name must be fully spelled out on your zoom account for credit) See [Course schedule](#) for days / Lab: You must sign up to attend (see the [Week 1](#) page for more information).
- What are we working on each week? Look at the [Course Schedule](#), Weekly Pages, and Assignment links, ask a TA or Peer Instructor! You have so many resources!
- What do I do if I am sick/miss class? Look at the course [Grading - Attendance](#) and how final grades are determined. All lessons are recorded and posted after class so the material can be watched.
- How am I graded on different assignments? See the assignment rubrics on the Weekly Page links or assignment links
- Can I turn in late work/revise an assignment? Yes, see the Resubmission guidelines in the [Syllabus](#)
- What's the deal with quizzes? Quizzes are open note and you get one chance to complete them on Gradescope. The [Syllabus](#) explains how grades work.
- This grading scale is weird, how does it work? Check out the [syllabus](#) to help you understand how the grade works.

- What if I need lab accommodations because of a disability? **Tell Dr. Hastie (you do not have to disclose your disability) and we will do the best we can to accommodate!**
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### Course Organization and how to find things:

The best places to begin are this Home page and the "[Syllabus](#) and [Course Schedule](#)" pages. I will organize the Canvas site so that you are aware of weekly deadlines and happenings (be sure to check the **Weekly Pages**" and "[Announcements](#)" links, and **your UNC email**). I've also provided a guided video tour of the Canvas site below.

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### Course Expectations:

**You belong!** Every student in this course should feel welcome to engage in discussion that is respectful and values the perspectives of individuals from all backgrounds. Personally, I will add that I am a proud member of the National Organization of Gay and Lesbian Scientists and Technical Professionals and advisor to [oSTEM](#)

[Links to an external site.](#) on campus at UNC.

### Building our classroom community:

**I want you all to get to know each other!** To build a classroom community, you'll be expected to actively engage in the class through in class and online course discussions. If you want to share a recipe you liked or an accomplishment that you're proud of, that's great as well!

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### A little about me:

Hello all. I'm Eric and I love biology and skills development—the more we learn, the less we know! I'm a teaching assistant professor in the biology dept. I have a background in journalism and communications, a degree in culinary arts, and attended graduate school for biology (for my PhD I built new viruses that kill pancreatic cancer). I've taught A&P, vertebrate embryology, Genetics, Virology, and more! When I'm not teaching you can find me counting bird species in my garden where I grow food and flowers. Otherwise, I might be sailing on our boat named Pier Reviewed—yes, my partner and I are super nerds.

## Course Syllabus

### Syllabus

- [Course Overview/Goals](#)

- [Materials](#)
- [Grading](#)
- [Course Policies](#)

## Course Overview

What is research and how is it done? BIOL 105L aims to give you a first-hand exposure to the scientific approach in real world situations. You will build your science skills toolkit—experimental design, data processing and interpretation, basic statistics, system modeling, interdisciplinary approaches, and science communication and policy—then use it to explore relevant societal issues like global warming, virus evolution and vaccine development, cancer therapeutics, and more!

**Pre/co-requisite:** BIOL 101 credit (UNC credits or BE) or placement (PL) through the BIOL 101 placement exam. This course is for first year biology majors and transfer students only. If you do not fall into this category, you must drop the course.

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## Course Goals

We'll learn about science, its application, and empower you to confidently discuss issues in the world today. By the end of the semester you will gain valuable skills in the following areas:

1. **Process of science:** Students should be able to summarize and evaluate scientific literature and in doing so discuss and interpret the scientific process and experimental design, propose and conduct a research project of their own, collect data, and present their conclusions clearly.
2. **Quantitative Reasoning:** Students should perform basic unit conversions and understand and perform statistical tests (e.g., mean versus median, standard deviation vs., standard error of mean, statistical significance versus biological significance, T-test, etc...) to interpret data in primary literature and collect and explain data from their own work.
3. **Modeling:** Students will describe the use of models for representing biological processes as well as sketch flow charts, diagrams, or concept maps to organize thinking and problem solving.
4. **Interdisciplinary:** Students will examine current research topics and suggest how collaboration in STEM and non-STEM disciplines could contribute to real-world solutions, discussing the contributions of different stakeholders in policy proposals when applicable.
5. **Communication and Collaboration:** Students will compare language styles used to communicate science effectively to targeted audiences (e.g., general public, biology experts, collaborators in other disciplines), integrating ideas from teammates with different perspectives to evaluate their own understanding.
6. **Society:** Students should be able to identify and evaluate how systemic factors affect by whom science is conducted, discuss historical cases of scientific misconduct, and describe the roles scientists have in facilitating public understanding of science

Be sure to look at the [Course Schedule](#) page to record important dates on your calendar.

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## Your Instructor

**Instructor:** Eric Hastie (ehastie@email.unc.edu)

**Office Hours / Communication:** TBD in 235 Wilson Hall / You can also make additional appointments on Zoom if those times don't work. If needed, please send me an email with three times that work for you ([email template](#)

[Download email template](#)).

**Course Meeting time:** See [Course Schedule](#) for meeting days. Zoom links are on the weekly pages.

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## Materials

OneDrive: <https://onedrive.unc.edu/>

[Links to an external site.](#)

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## Course Grading

**You are in charge of your grade in this course. Your final performance will be based on Canvas discussions, synchronous attendance, weekly projects, lab modules/notebook, a bio art project, quizzes, and a final course project. We will use specification grading such that you will choose which level of accomplishment will determine your final grade in the course. Everyone starts with a D and you can determine your grade by how much you accomplish in the course!**

**How much is each part of the course worth?**

- **DISCUSSIONS** - Complete 6/8 (Raises you one grade: e.g. A- to A)
- **ATTENDANCE (ZOOM)** - Attend 9/10 (You must have your full name showing or no credit; you must also attend for at least 80% of the class time to get credit) (Raises you one grade: e.g. A- to A)
- **PROJECTS** - Complete 8/9 with an E (Raises you two Grades: e.g. B+ to A) - (Resubmissions allowed, see below)
- **LAB Notebook** - Complete 3/4 (Raises you one grade: e.g. A- to A)
- **BIO ART PROJECT** - Must turn in per directions (Raises you one grade: e.g. A- to A)
- **QUIZZES** - Get a total of 80 points combined (Raises you one grade: e.g. A- to A)
- **FINAL PROJECT** - a grade of E needed (Raises you two grades: e.g. B+ to A) - (There are no resubmissions on the final project!)

\*There are no additional attempts for weekly discussions, attendance, lab notebooks, bio art project, quizzes, or final project.

\*\*For quizzes ([these are open note](#)), be sure to complete them on time! Set a reminder in your calendar! The [pre-health module](#) replaces one low quiz score: You must complete the entire module and pre and post surveys by LDOC - If you don't put your PID I can't give credit.

\*\*\*For weekly project resubmissions: If you need to revise your project to improve your score, you will have one week after the feedback date to resubmit (subject to change as needed by Dr. Hastie). **For all resubmissions, you must show your new work and explain your new understanding from completing the revision.** You or one group member (if applicable) should resubmit on the original assignment page and fill out the form here: [Resubmission Form](#)

[Links to an external site.](#)

[Links to an external site.](#)

\*\*\*There is no resubmission for the final project. Be sure to not rush it at the end! **Follow directions!**

Here is a [optional module](#) to help you learn to study and be successful in the biology major!

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Course Policies

### **Honor Code Statement:**

All students are expected to follow the guidelines of the UNC honor code. In particular, students are expected to refrain from “lying, cheating, or stealing” in the academic context. You can read more about the honor code at [honor.unc.edu](http://honor.unc.edu)

[Links to an external site.](#) In any course, including mine, what constitutes cheating can change from one activity to another. For example, collaboration may be encouraged for an assignment but qualify as cheating during an exam. Please see my guidelines for each activity, and if you are unsure, please ask me to clarify. In remote classes, there may be many temptations for using online exchange sites, such as Chegg. Note that these sites provide names of students who have used their materials, and they routinely cooperate with institutions around academic integrity issues. Please don't get caught up with honor code issues just because it appears to be simple and untraceable. It is not!

### **Accessibility:**

The University of North Carolina at Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in barriers to fully accessing University courses, programs and activities.

Accommodations are determined through the Office of Accessibility Resources and Service (ARS) for individuals with documented qualifying disabilities in accordance with applicable state and federal laws. See the ARS Website for contact information: <https://ars.unc.edu>

[Links to an external site.](#) or email [ars@unc.edu](mailto:ars@unc.edu).

### **Guidelines for using Generative AI:**

The University of North Carolina at Chapel Hill policy for us of AI in class can be found here: [LINK](#)

[Links to an external site.](#)

**A few highlights from the document include:** AI should help you think. Not think for you. You are 100% responsible for your final product. The use of AI must be open and documented. You are responsible for reading and following these guidelines.

### **TITLE IX:**

Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC at <https://eoc.unc.edu/report-an-incident/>

[Links to an external site.](#) Please contact the University's Title IX Coordinator (Elizabeth Hall, interim – [titleixcoordinator@unc.edu](mailto:titleixcoordinator@unc.edu)), Report and Response Coordinators in the Equal Opportunity and Compliance Office ([reportandresponse@unc.edu](mailto:reportandresponse@unc.edu)), Counseling and Psychological Services (confidential), or the Gender Violence Services Coordinators ([gvsc@unc.edu](mailto:gvsc@unc.edu); confidential) to discuss your specific needs. Additional resources are available at [safe.unc.edu](http://safe.unc.edu)

[Links to an external site.](#)

### **Copyright Policy:**

All course materials including your notes, assignments, and Zoom lectures are covered by [University Copyright Policy Links to an external site.](#)] : This means it is illegal to share any course materials with anyone not directly affiliated with this class.

### **Honor Code:**

You must sign a pledge on all graded work certifying that no unauthorized assistance has been given or received. You are not to divulge any information about an exam to a student who has not yet taken that exam. You are responsible for consulting with your professor if you are unclear about any particular act on your part constitutes plagiarism.

### **EOC Incident Report:**

The Equal Opportunity and Compliance Office handles student, employee, and visitor reports of discrimination and harassment based on age, color, disability, genetic information, national origin, race, religion, sex (including gender, gender expression, or gender identity), sexual orientation, and veteran status. This includes reports of sexual misconduct, including sexual harassment and sexual violence. Our office also handles reports of relationship violence and stalking. <https://eoc.unc.edu/report-an-incident/>  
[Links to an external site.](#)

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**\*\*THE PROFESSOR RESERVES THE RIGHT TO MAKE CHANGES TO THE SYLLABUS, INCLUDING ASSESSMENT DATES. THESE CHANGES WILL BE ANNOUNCED AS EARLY AS POSSIBLE\*\***

### **Course Schedule**

**BIOL 105 Course Schedule - Spring 2024**

This schedule is your source for lesson dates, assignments, and projects. Weekly content can be found in the Weekly Left Navigation Links.

\*Remember, for lecture we will meet remote, synchronously. It is **Section 401**: Mondays (12:20 - 1:10 p.m.) / **Section 402**: Wednesdays (12:20 - 1:10 p.m.) Zoom links on Home Page and Syllabus.

### Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS
<b>WEEK 1</b> <b>01102024</b>	<ul style="list-style-type: none"><li>○ <b>Lecture TOPIC: Getting to know BIOL 105L/Canvas I</b></li><li>○ <b>Lecture PROJECT:</b> Submit lab safety / team contracts</li><li>○ <b>Lab TOPIC/Project:</b> Sign up for lab time</li></ul>	<ul style="list-style-type: none"><li>○ <b>Complete Safety and Team Contracts and submit on Gradescope</b></li><li>○ <b>Sign up for lab time - FIRST COME, FIRST SERVED</b></li></ul>
<i>WEEK 2</i> <i>01152023</i>	<ul style="list-style-type: none"><li>○ <b>Lecture TOPIC: Getting to know BIOL 105L/Canvas II</b></li><li>○ <b>Lecture PROJECT:</b> OneDrive Setup / Discussion 1</li><li>○ <b>Lab TOPIC/Project:</b> Sign up for lab time</li></ul>	<ul style="list-style-type: none"><li>○ <b>Canvas Discussion Topic:</b> Introductions/ Diversity in STEM</li><li>○ <a href="#">OneDrive</a></li></ul>
	<ul style="list-style-type: none"><li>○ <a href="#">Links to an external site.</a> Science Toolkit Setup</li><li>○ <b>Sign up for lab time - FIRST COME, FIRST SERVED</b></li></ul>	

## Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS	
		<ul style="list-style-type: none"><li>○ <b>Lecture TOPIC: Introduction to Biology Skills</b></li><li>○ <b>Lecture PROJECT:</b> Read and review a micropublication</li><li>○ <b>Lab TOPIC/Project: Module Two: Pipetting and Dilutions</b></li><li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication</li></ul>	<ul style="list-style-type: none"><li>○ Individual Micropub assignment</li><li>○ Pre-lab dilutions worksheet / Lab Dilutions</li></ul>
<i>WEEK 3 01222024</i>		<ul style="list-style-type: none"><li>○ <b>Lecture TOPIC: Introduction to Literature/Searches</b></li><li>○ <b>Lecture PROJECT:</b> Choose a micropublication as a group and review it. Come up with outstanding questions and answer them together.</li><li>○ <b>Lab TOPIC/Project: Module Three: Bacterial Dilutions / Plating</b></li><li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication</li></ul>	<ul style="list-style-type: none"><li>○ Choose a micropublication with your lab group, read and discuss then write and submit report.</li><li>○ Start a Lab Notebook File / Assays Folder/Document in your OneDrive Toolkit</li><li>○ <b>QUIZ 1 (Gradescope)</b></li></ul>
<i>WEEK 4 01292024</i>			

## Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS
		<ul style="list-style-type: none"><li>○ <b>Lecture TOPIC:</b> <b>Experimental Design / Hypothesis Testing</b></li><li>○ <b>Lecture PROJECT:</b> As a group, choose a research paper and record a video presentation for a non-science audience</li><li>○ <b>Lab TOPIC/Project:</b> <b>Module Four:</b> Lab Notebooks</li><li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding</li></ul>
	<i>WEEK 5</i> <i>02052024</i>	<ul style="list-style-type: none"><li>○ Group research paper / presentation / Peer Review</li><li>○ Lab Notebook Assignment</li></ul>
	<i>WEEK 6</i> <i>02122024</i>	<b>NO CLASS / NO LAB MEETING - WELL BEING DAY</b>

## Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS
		<ul style="list-style-type: none"><li>○ <b>Lecture TOPIC: Basic / Translational Science</b></li><li>○ <b>Lecture PROJECT:</b> Learn ImageJ and collect data from image analysis (Individuals contribute to group data set)</li><li>○ <b>DATA:</b> from Dr. Steve Rogers for Image Analysis (lipid droplets and experimental conditions (blinded))</li><li>○ <b>Lab TOPIC/Project:</b> Module Five: Microscopy and Wild Bacteria</li><li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding / ImageJ</li></ul>
		<ul style="list-style-type: none"><li>○ <b>Canvas Discussion Topic:</b> Scientific Retraction</li><li>○ Data collection and generation of shared data set</li><li>○ <b>QUIZ 2 (Gradescope)</b></li></ul>
	<i>WEEK 7</i> <i>02192024</i>	

## Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS
<i>WEEK 8</i> <i>02262024</i>	<ul style="list-style-type: none"><li>○ <b>Lecture TOPIC: Statistical Analysis</b></li><li>○ <b>Lecture PROJECT:</b> Perform basic statistics and report on data from previous week / Peer Review</li><li>○ <b>DATA:</b> from Dr. Steve Rogers for Image Analysis (lipid droplets and experimental conditions (blinded))</li><li>○ <b>Lab TOPIC/Project:</b> Module Six: BioArt</li><li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding / ImageJ / Basic Statistical Analysis</li></ul>	<ul style="list-style-type: none"><li>○ <b>Canvas Discussion Topic:</b> Model Organisms</li><li>○ Data analysis / submission of group analysis of shared data</li><li>○ Lab Notebook Assignment</li><li>○ BioArt Project: Due 04012024</li></ul>

## Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS
<i>WEEK 9</i> <i>03042024</i>		<ul style="list-style-type: none"><li>○ <b>Lecture TOPIC: Ecological Diversity I - Field Work</b></li><li>○ <b>Lecture PROJECT:</b> Choose a data set and make a short presentation of the data / Peer Review</li><li>○ <b>DATA:</b> from Dr. Allen Hurlbert for Caterpillars Count!</li><li>○ <b>Lab TOPIC</b> Module Makeup Labs!</li><li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding / ImageJ / Basic Statistical Analysis / Data Exploration and Reporting</li></ul>
<i>WEEK 10</i> <i>03112024</i>		
	<b>NO CLASS / NO LAB MEETING - SPRING BREAK</b>	

## Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS
<p><i>WEEK 11</i> <i>03182024</i></p>	<ul style="list-style-type: none"> <li>○ <b>TOPIC: Ecological Diversity II - Genomics</b></li> <li>○ <b>PROJECT:</b> Learn ApE software, BLAST, and how to make a phylogeny / Peer Review</li> <li>○ <b>DATA:</b> from Barbara Stegenga (bacterial diversity, identification, and phylogenetic tree)</li> <li>○ <b>Lab TOPIC</b> Module Seven Primer Design</li> <li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding / ImageJ / Basic Statistical Analysis / Data Exploration and Reporting / ApE / BLAST</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Canvas Discussion Topic:</b> Science Ethics</li> <li>○ Species identification and DNA engineering, submission of primer report</li> <li>○ BioArt Project: Due 04012024</li> <li>○ Keep working on your Final Project (Outline is Due 04012024)</li> </ul>
<p><i>WEEK 12</i> <i>03252024</i></p>	<p><b>NO CLASS / NO LAB MEETING - WELL BEING DAY</b></p>	<ul style="list-style-type: none"> <li>○ <b>Start thinking about your final Lecture project (Due LDOC)</b></li> </ul>

## Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS
<i>WEEK 13</i> <i>04012024</i>	<ul style="list-style-type: none"><li>○ <b>Asynchronous Video   TOPIC: Observations</b></li><li>○ <b>Lecture PROJECT:</b> Establish course field sites for future students and record observations from the site.</li><li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding / ImageJ / Basic statistical analysis / Data Exploration and Reporting / ApE / BLAST / Field site work</li></ul>	<ul style="list-style-type: none"><li>○ <b>Canvas Discussion Topic:</b> Scientific Observation</li><li>○ <b>QUIZ 4 (Gradescope)</b></li><li>○ Data exploration and reporting</li><li>○ Submit BioArt Project on Canvas and Print out picture/description for the room.</li><li>○ Submit Final Project Outline on Canvas</li><li>○ Keep Working on your Final Project (Due LDOC)</li></ul>
<i>WEEK 14</i> <i>04082024</i>	<ul style="list-style-type: none"><li>○ <b>TOPIC: Virus Biology, Emerging Viruses, and Vaccine Development</b></li><li>○ <b>Lecture PROJECT:</b> As a group, choose a primary research paper and write a report</li><li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding / ImageJ / Basic statistical analysis / Data Exploration and Reporting / ApE / BLAST / Field site work / analysis, planning, and presentation</li></ul>	<ul style="list-style-type: none"><li>○ <b>Canvas Discussion Topic:</b> Viruses in the Ocean</li><li>○ Group research paper report / Peer Review</li><li>○ Keep working on your Final Project (Due LDOC)</li></ul>

## Course Schedule

WEEK	TOPIC / WEEKLY SKILLS	ASSIGNMENT / ASSESSMENTS
<p><i>WEEK 15</i> <i>04152024</i></p>	<ul style="list-style-type: none"> <li>○ <b>TOPIC: Clinical Trials</b></li> <li>○ <b>FINAL LECTURE PROJECT:</b> Keep working on it! Due next week!</li> <li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding / ImageJ / Basic statistical analysis / Data Exploration and Reporting / ApE / BLAST / Field site work / analysis, planning, and presentation</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Canvas Discussion</b> <b>Topic:</b> Vaccine Development</li> <li>○ Keep working on your Final Project (Due LDOC)</li> <li>○ <b>QUIZ 5 (Gradescope)</b></li> </ul>
<p><i>WEEK 16</i> <i>04222024</i></p>	<ul style="list-style-type: none"> <li>○ <b>TOPIC: How to get involved in Research</b></li> <li>○ <b>FINAL LECTURE PROJECT:</b> Keep working on it! Due next week!</li> <li>○ <b>SKILLS:</b> Reading / Discussing Literature / Science Communication / Experimental Design / Assay/Technique Understanding / ImageJ / Basic statistical analysis / Data Exploration and Reporting / ApE / BLAST / Field site work / analysis, planning, and presentation</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>Canvas Discussion</b> <b>Topic:</b> Assays / Experiments</li> <li>○ Keep working on your Final Project (Due LDOC)</li> </ul>
<p><i>WEEK 17</i> <i>04292024</i></p>	<p><b>NO CLASS MEETING - FINAL PROJECT CONSULTATIONS</b></p>	<p><b>LDOC: 04302024 - <u>FINAL PROJECT DUE</u></b></p>