

Course Syllabus

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Biology Undergraduate Research for Credit (Biology 499R)

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Overview

Laboratory research can be a pivotal experience in your undergraduate career. Whether joining a lab for the first time or continuing projects that you have already started, this semester you will learn something new. You may gain insight about the scientific process, about the natural world or about yourself. **This**

course is like no other course. You will be expected to commit to independent research. Integrity, honesty, self-motivation and diligence are key. Ask questions. Enjoy!

While your main commitment in this course is based on your work on your research project, there are several mandatory assignments along the way, leading to a mandatory research report. Details are below.

Learning Objectives

Biology 499R is intended to provide students structured support as they develop, conduct and present biology-related research. You may work on independent or collaborative research projects. Projects may involve wet lab research, clinical research, bioinformatics, modeling or meta-analyses. Some projects may be more qualitative than others. In all cases, **the work should be driven by a question or set of questions related to the biological sciences**. Students cannot, for example, be learning techniques without the goal of applying those to a defined project later, nor can they write a literature review. As research can be slow, it is fine if you do not get to the point of finishing the project within the semester. However, regardless of the stage of your project, you will be expected to produce a final research manuscript (Fall) or research poster (spring). After this semester's research experience, you should be better able to:

- Plan and conduct authentic experiments, and/or critically evaluate experimental data.
- Perform self-motivated experimental research
- Actively participate in scientific discussions with a critical approach to the research
- Write a research paper and present hypotheses and/or results in a professional way
- Define ethical standards and academic integrity in the research process
- Describe and adjust to the unpredictabilities, the unexpected challenges, and the unknowns that are a common part of conducting research.

Course Director



Dr. Nicole Gerardo

- Professor, Department of Biology
- Email: nicole.gerardo@emory.edu
- Office Hours: by appointment
 - Zoom (Meeting ID: 973 2952 0340, Passcode: research)
 - In person, 1111 O Wayne Rollins

Mentoring students in research is one of the most rewarding, important aspects of my career. My goal is to facilitate your independent research experience. Some reasons to reach out to me would be:

- If expectations for the course are unclear
- If you are having trouble interacting with your mentor(s) or others in your lab.
- If you are having trouble meeting obligations of the program, which include 12-16 hours per week working on your project, reading and writing.
- If you need to withdraw from the course.
- If you are interested in other research opportunities and would like some advice.
- If you need help with assignments, or additional feedback on your written work and figures
- If you have questions about graduate school or other career paths

Overview of Assignments

See Course Schedule, below, for due dates.

Most assignments are due on a Thursday. As each assignment is helping you build knowledge and accomplish goals. To this end:

- **Assignments will not receive full credit if more than 3 days late, unless permission to submit it late was requested in advance of the due date (not on the due date or after) due to illness or a situation beyond your control.**
- **Assignments turned in more than two weeks late will receive a grade of zero. Exemptions to this policy will be extremely limited.**

Two assignments are optional if you have taken Biol 499R in a previous spring semester. If so, please fill out this form to indicate what spring semester you took Biol 499R:

<https://forms.gle/XukmZb7GRSBRhn8W9>  (<https://forms.gle/XukmZb7GRSBRhn8W9>)

Reading Assignments. 2pts each.

- To keep you in the habit of reading research related to your own, you will have two reading assignments at the beginning of the semester. For those students who have been working on their projects for a while, you should select papers that are new to you.

Short Overview of Research and Mentorship Plan. 3pts

- To make sure you discuss expectations and your project with your mentor(s) early in the semester, you will complete this short assignment to identify what question(s) you will be addressing with your research and what approach you will take. You can complete this with any mentor you are working with (e.g., a graduate student, postdoc, research technician or faculty member).

Elements of a Compelling Poster. 3pts

- This will require watching a short video and assessing the quality of a few posters
- **This is optional if you took Biol 499R in a previous SPRING semester. See above.**

How to Give a Great Scientific Talk. 4pts

- This assignment will involve watching several videos, overviewing a couple of resources and attending at least one research seminar.
- **This is optional if you took Biol 499R in a previous SPRING semester. See above.**

Final Presentation Sign Up. 2pts

- You will need to decide whether you will give a short (5-7 minute) research talk or do a poster presentation. You will need to sign up in advance to allow for sufficient time to organize the online research sessions.

Practice Presentation on Zoom. 3pts

- You are required to attend one of four zoom sessions to give a practice talk or presentation of our poster.
- These will be the week prior to undergraduate research week.
- Details about dates and times will be posted in the schedule, below.

Final Research Presentation. Satisfactory/Unsatisfactory

- Receiving a satisfactory grade is based on:
 - the completeness of all sections of your presentation according to the guidelines.
 - whether the presentation is sufficiently clear
 - whether all text and figures are appropriately referenced and attributed.
- If you receive an unsatisfactory, you will receive a one letter grade deduction for your final grade in the course (e.g., A to B). You will be given an opportunity to revise your presentation and request a regrade based on that revision.
- Your research mentor will consider the quality of your presentation in determining the grade they assign you.

Research Mentor Grade. 150pts

- The majority of your grade will be determined by your faculty research mentor. I will email your research mentor towards the end of the semester asking for them to email me your grade. If I do not receive the grade, you will receive an incomplete for the course.
- Your grade is not based on your findings. Science experiments don't always work the first time, and science is not about getting the answer that you wanted. **Your grade will be based on your faculty mentor considering the following questions:**
 - Did the research student in your lab make progress? Did they develop a project and attempt experiments or analyses?
 - Was the research student reliable?

- o Did the research student work on their project at least 12-16 hours per week. Please consider time spent reading and working on their final presentation?
- o Did the research student ask for assistance when needed and respond to feedback appropriately?
- o Did the research student communicate effectively?
- o How was the quality of your students' final research presentation (poster or talk)? Please remember for a first semester student that they may not yet have data.

Final Grades

- If your final presentation is considered incomplete, you will receive one letter grade lower than your grade posted in canvas. You will then have an opportunity to re-present your poster/talk and raise your grade. Assuming you are not graduating, this can be completed in the summer.
- I will not change a grade if it contradicts the grade provided by your mentor.
- Should you be concerned about the grade your mentor assigned you, the first thing to do is to try to arrange a conversation with them about the basis for the grade and your concerns. I recommend that you try to have a conversation on zoom or in person rather than to discuss this via email only. Should that not resolve your concerns, please contact me. We can set up a meeting with all three or us, and we can include your direct mentor if appropriate.
- Letter grade cut-offs:
 - o A 93.3 or more
 - o A- 90 to 93.2
 - o B+ 87.7 to 89.9
 - o B 83.3 to 87.6
 - o B- 80 to 83.2

Accommodations

Many accommodations that students have for other courses (e.g., extra time for exams) may not be relevant for Biol 499r. However, you should consider the nature of what you best need to be supported in a research setting. As best as possible, while filling out the mentor-mentee agreement, be open about your needs with your mentor(s). Feel free to reach out to Dr. Gerardo if you have any questions or would like to discuss more.

Getting Help with Writing

Scientific writing, like all writing, is hard. Scientific writing may also be quite different than other writing that you have done in the past.

- The Emory Writing Center (EWC) is available to support student writers on a range of projects, including scientific research manuscripts and reports. EWC tutors are trained to meet with writers of all levels, at any stage of the writing process, from brainstorming to final revisions. Tutors do not proofread or edit, but instead share skills and resources through dialogue and inquiry; they guide writers to revise and edit their own work. EWC services are available in multiple languages, and several tutors are ELL Specialists trained to support English Language Learners. Please visit their website to learn more and to make an appointment: <http://www.writingcenter.emory.edu/> (<http://www.writingcenter.emory.edu/>)
- Give your mentors sufficient time to give you feedback on your writing. Set up a schedule of when you will submit draft to them for comment.

Honor Code

The honor code is in effect throughout the semester, and applies to your conduct in your research just as it applies to your conduct in a classroom. By taking this course, you affirm that it is a violation of the code to plagiarize, to give false information to a faculty member, and to undertake any other form of academic misconduct, which includes scientific misconduct. You also affirm that if you witness others violating the code you have a duty to report them to the honor council.

The following are examples of honor code violations associated with this course:

- falsifying data.
- providing false information to the course instructor or any research mentor.
- using any text from a published research article, a grant or paper draft written by someone other than yourself in any assignment unless you have prior consent from the course instructor to collaborate on your research report.
- intentionally inappropriately referencing the research of others in any assignment.
- unintentionally plagiarizing or inappropriately referencing the writing or research of others because of use of AI.
- using AI to generate content without express permission on any writing assignment, including any component of a Biol 499R research paper, talk or poster. Note, you may use AI tools to edit content.

For more Honor Code Info:

<http://catalog.college.emory.edu/academic/policies-regulations/honor-code.html>

Course Schedule

Here, I provide a detailed list of suggestions for what you should be doing each week. Please overview this schedule with your mentors. All assignments and their due dates are in bold.

Most assignments are due on a Thursday.

Spring 2024	
DATE	SUGGESTED COURSE OF ACTION / EVENT/ ASSIGNMENT
Tuesday, January 16th	<ul style="list-style-type: none"> • First Day of Classes. • If you have not done so, contact your mentor to set up a time to meet about your projects and expectations.
Week of January 15 to January 19	<ul style="list-style-type: none"> • Watch the Introduction of 499R video (coming soon). • Try to have a first meeting of the semester with your mentor. At this meeting, discuss both your expectations and your mentor(s)' expectations. See the Getting Started Page (https://canvas.emory.edu/courses/125012/pages/getting-started) for more details. • Ask your research mentor(s) for papers that you should read. • Ask your research mentor(s) if they are having a weekly lab meeting. If so, try to attend each week. • Before the week of March 25th, you will need to attend one biology-related seminar. Find out from your mentor(s) what seminar(s) they suggest and how to attend them. Emory hosts many biology-related seminars each week.
Week of January 22 to January 26	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Read at least two primary literature articles related to your research this week. • Begin your research project if possible. • Before the week of March 25th you will need to attend one biology-related seminar. Find out from your mentor(s) what seminar(s) they suggest and how to attend them. Emory hosts many biology-related seminars each week.
Week of January 29th to February 2nd	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Read at least two primary literature articles related to your research this week. • Before the week of March 25th, you will need to attend one biology-related seminar. Find out from your mentor(s) what seminar(s) they suggest and how to attend them. Emory hosts many biology-related seminars each week. • Complete the First Research Paper Reading Assignment

	<ul style="list-style-type: none"> ○ Due Date February 1st. ○ This assignment is required for all students
Week of February 5th to February 9th	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Get started in the lab if you have not already done so! • Complete the Short Overview of Your Research Plan Assignment, if you have not already done so. <ul style="list-style-type: none"> ○ Due Date February 8th ○ This assignment is required for all students
February 12th to February 16th	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Read at least two primary literature articles related to your research this week. • Continue your Research Project • Before the week of February 27th, you will need to attend one biology-related seminar. Find out from your mentor(s) what seminar(s) they suggest and how to attend them. Emory hosts many biology-related seminars each week.
February 19th to February 23rd	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Read at least two primary literature articles related to your research this week. • Continue your Research Project • Complete the Second Research Paper Reading Assignment <ul style="list-style-type: none"> ○ Due Date February 22nd. ○ This assignment is required for all students
February 26th to March 1st	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Read at least two primary literature articles related to your research this week. • Continue your Research Project • If you have not yet attended a research seminar, you will need to do so in order to complete the How to Give a Great Talk Assignment, for next week. • With advice from your mentor(s), decide whether you will give a final research talk or complete a poster presentation. If you are ready, complete the presentation sign up (see below) • Complete the Elements of a Compelling Poster Assignment <ul style="list-style-type: none"> ○ Due Date February 29th. ○ This assignment is optional if you have taken Biol 499R in a previous spring semester. See the top of the assignments section for more information.

March 4th to March 8th	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • If you plan to take a break from lab research during spring break, please discuss this with your mentor. • Read at least two primary literature articles related to your research this week. • Continue your Research Project • Read over the 2024 Biol 499R presentation and poster guidelines • With advice from your mentor(s), decide whether you will give a final research talk or complete a poster presentation. If you are ready, complete the presentation sign up. • Complete the How to Give a Great Talk Assignment <ul style="list-style-type: none"> ◦ Due Date March 7th. ◦ This assignment is optional if you have taken Biol 499R in a previous spring semester. See the top of the assignments section for more information. • Complete the Presentation Sign Up <ul style="list-style-type: none"> ◦ Due Date March 7th. ◦ This assignment is required for all students
Week of March 11th to 15th	<ul style="list-style-type: none"> • <i>Spring Break.</i> Make sure that you let your mentors know your plans for this week.
Week of March 18th to March 22nd	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Read at least two primary literature articles related to your research this week. • Continue your Research Project. • Work on your poster or presentation • Put an online practice presentations session on your calendar. You are required to attend one. <ul style="list-style-type: none"> ◦ Everyone must sign up for, present and give feedback to peers at one presentation practice session. You will screen share your talk or poster and given a short presentation for feedback. ◦ The sessions will be: <ul style="list-style-type: none"> ▪ Session 1. Date/time to be posted soon. ▪ Session 2. Date/time to be posted soon. ▪ Session 3. Date/time to be posted soon. ▪ Session 4. Date/time to be posted soon. ◦ All sessions will use the same zoom link.

Week of March 25th to March 29th	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Read at least two primary literature articles related to your research this week. • Continue your Research Project. • Work on your poster or presentation.
Week of April 1st to April 5th	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Read at least two primary literature articles related to your research this week. • Continue your Research Project • Finalize your poster or presentation • Those giving poster presentations must submit their poster to the printer: <ul style="list-style-type: none"> ◦ Posters should be submitted to the Biol 499R Posters folder. ◦ Your file should be named "lastname_firstname", e.g., Darwin_Charles.ppx ◦ Posters must be submitted to be printed by Tuesday, April 9th.
Week of April 8th to April 12th	<ul style="list-style-type: none"> • Finalize Poster if printing through Biology. It is must be submitted by Tuesday, April 9th (see above). • Finalize your presentation. • Give a practice talk or poster presentation in your lab or to your mentors. • Online Practice Presentations <ul style="list-style-type: none"> ◦ Everyone must sign up for, present and give feedback to peers at one presentation practice session. You will screen share your talk or poster and given a short presentation for feedback. ◦ The sessions will be: <ul style="list-style-type: none"> ▪ TBT ◦ All sessions will use the same zoom link. • Meet with your mentor at least once this week. • Continue your Research Project
Week of April 15th to April 19th	<ul style="list-style-type: none"> • Meet with your mentor at least once this week. • Continue your Research Project • Attend Undergraduate Research Week Events
April 15th to April 19th	<h2>Undergraduate Research Week</h2>

	<p style="text-align: center;">Biology Undergraduate Research Keynote Talk</p> <p style="text-align: center;">Dr. Paul Turner</p> <p style="text-align: center;">R. Randall Rollins (RRR) P01 (plaza level towards south end)</p> <p style="text-align: center;">April 18th, 11:30AM</p> <p>Poster Session 1: Thursday, April 18th, 1:30 to 2:25 (arrive early)</p> <p>Poster Session 2: Thursday, April 18th, 2:30 to 3:25 (arrive early)</p> <p>Poster Session 3: Thursday, April 18th, 3:30 to 4:30 (arrive early)</p> <p>All poster sessions are in R. Randall Rollins (RRR) P01 (plaza level towards south end). This is the new public health building.</p> <p>Research Presentation Sessions virtually and in classes throughout the week</p>
<p>Week of April 22nd to April 26th</p>	<ul style="list-style-type: none"> • Final Research Presentations Sessions (if needed) • Make sure lab notes and all files that need to be available to others are clear and organized • Turn in your poster or presentation slides to canvas via final presentation assignment. Even if you had to submit a poster to print, you still need to upload your file to canvas. <ul style="list-style-type: none"> ◦ Due Date: April 24th. ◦ This assignment is required for all students
<p>April 29th.</p>	<ul style="list-style-type: none"> • Last Day of Classes • Research Mentor Grade Due (I will contact them directly to ask for your grade)