

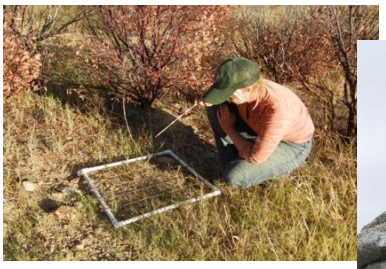


Shoals Marine Laboratory
Research in Biology (RiB) (BIOSM 4990/MEFB 751)
July 31-August 14, 2023

Faculty: Dr. Carolyn (Carrie) Keogh (she/her) (ckeogh@emory.edu)

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Prerequisites: MEFB 403 Investigative Marine Biology Laboratory or permission of instructor(s)

Course description: Welcome, we're glad you are here! This course is an exciting two-week introduction to all aspects of independent research. We will build a scientific community to support one another to **propose a testable biological question and carry out the field or lab work to answer the question**. You will practice the full scientific process - from proposing a question and generating a hypothesis, to designing study methods, troubleshooting, collecting data, and interpreting and communicating your findings. We will also practice a key scientific skill of peer feedback - ideas are strengthened with many minds!

Field time will be primarily dedicated to independent research where you will be in charge of your own data collection. Classroom sessions will include discussions of primary literature, workshop sessions for data analysis, peer feedback, and lectures on statistics, programming, and presentation skills. At the end of the course, students will present their research in a symposium and submit a written report in the style of a brief scientific article.

Course learning outcomes:

- Pose a testable research question that is grounded in current scientific literature
- Design and execute an independent data collection effort
- Analyze, visualize, and interpret original data
- Communicate to diverse audiences about research in both oral and written formats

Course expectations and assessment: RiB follows a non-traditional format that involves significant independent work time. You will be responsible for managing your time to ensure that you can complete all stages of your research project. You will be expected to communicate clearly and frequently with your faculty instructors about your progress, challenges, schedule, etc and to show significant initiative in addressing challenges that arise at each stage. Though you will work independently on your project, you will have many opportunities to collaborate with peers and both give and receive critical feedback, assistance, and support. Your independent work and your peer interactions should all reflect professionalism and uphold SML's spirit of collaborative learning. Your

contributions to class activities (including attending rock talks), and your ***professionalism, initiative, and collaboration will constitute 12% of your course grade.*** Milestone assignments and other elements of assessments are outlined here:

Annotated bibliography (5%): In order to develop the context, rationale, and methodology for your study, you will rely on published scientific literature. You will identify a minimum of 5 journal articles from the primary literature upon which your project will build, and describe in 1-2 sentences how each reference contributes to your proposed study. Your bibliography should include approximately 2 papers that help develop the context of your study, 1-2 papers that detail important aspects of your study system, and 1-2 papers on which your methods will be based.

5-slide project proposal (5%): You will present your study context (1 slide), your research question (1 slide), your hypotheses (1 slide), and your preliminary approach/methods (1-2 slides) in a 5-slide powerpoint (or similar) presentation to your peers. These presentations will be limited to 5 minutes followed by 10 minutes of workshopping your ideas with the class.

Detailed methods draft (6%): A detailed draft of your project methodology including rationales and references.

Progress checks (20% total):

- Expected results plot
- Draft data sheets
- Notebook check-ins and reflections
- draft results

Science communication (10% total): You will practice communicating your research ideas, approach, and results to the public by publishing a blog post or IG Reel/TikTok post during the second week of the class. Guidelines for posts will be provided.

Peer feedback (10%): Peer feedback plays a critical role throughout the process of science, from informal workshopping of ideas over coffee to formal peer reviews of scientific manuscripts by subject matter experts to debates published in the scientific literature. Though peer feedback will take place throughout the RiB course (you should ideally be talking through ideas, challenges, analyses, etc with your peers as much as possible!), your graded peer feedback assignment will focus on your peers' written report drafts. Each student will review the report draft of 2 other students and provide feedback and ideas to improve the quality of the report. Your feedback will be evaluated based on the thoughtfulness, thoroughness, specificity, and constructiveness of the comments you provide.

Symposium presentation (16%): You will present your research to a general audience in the style of a conference "lightning" talk. These extremely brief 5 minute talks will require significant organization and practice to distill your research context, question, methods, results, and interpretation into a presentation that an entirely new and possibly non-scientific audience can understand. The symposium will be open to the broader SML community.

Full research report (16%): At the end of the course, you will submit a report of your research project written as a scientific article. Your full report will include elements that you have developed throughout

the course (references from your annotated bib, methods with rationales, etc) as well as a visualization of your results and a brief interpretation. A rubric outlining expectations for the report will be provided.

Grade scale:

- A 94-100%
- A- 90-93.9%
- B+ 87-89.9%
- B 84-86.9%
- B- 80-83.9%
- C+ 77-79.9%
- C 74-76.9%
- C- 70-73.9%
- D 60 – 69.9%
- F less than 60%

Code of Conduct: We are excited at the prospect of working together to create new knowledge! We want RiB to be a meaningful and rewarding experience for all students. To that end, students should strive to **engage deeply** with the course material and help in **creating and maintaining a productive learning environment** for all students. To make sure you are on track and to assess your learning you are required to attend all activities associated with this course and complete all assignments by the times indicated by course faculty. You are responsible for the information presented in this syllabus and should discuss any questions you may have with us as soon as possible. Students, as part of the learning community here at SML, are responsible for treating their classmates, instructors, and the greater SML community with respect, and are responsible for fully understanding and adhering to all of the information presented in the SML Appledore Handbook and the 2021 COVID-19 Operating Plan.

1. *Disabilities & ADA Accommodation*: Good science is accessible science! Students with a disability should contact Cornell's (420 CCC building; 607-254-4545) or UNH's Student Accessibility Services four weeks prior to start of class for confidential discussion of needs and for registration to verify eligibility for academic accommodations. Unfortunately, retroactive accommodations can't be made, but communicate with your instructors to see if we can come to a solution together.
2. *Mental Health:* We and SML take your well-being very seriously. If you experience unusual personal or academic stress during the course or need to talk with someone about a personal problem, seek support from your instructors as soon as possible. In addition, you can consult any SML staff 24/7. Staff can be located in the Hamilton House office 8am – 7pm or knock on the door of Bartell House after hours.
3. *Academic Integrity:* While science is often a collaborative effort, all work submitted must be your own. Uncredited use of another person's words, data or images is considered plagiarism, a serious violation of the Code, whether the material comes from another student, a web site, or a published paper. If you are unsure how to cite or attribute an idea ask one of the instructors for guidance. Students must adhere to Cornell's and UNH's Policies for Academic Honesty and Integrity.
4. *Personal Technology / Electronic Devices:* Help maintain a welcoming and productive learning environment for all. Put away cell phones, smart phones, iPads, earbuds, or similar devices in the classroom or during course activities. When taking notes or participating in class activities on your computer, close unrelated applications or windows in order to prevent distracting yourself or your classmates. Use wifi access only for course-related searches during lectures.
5. *Computer Lab*. The lab has a modest computer facility in Laighton Library; please treat this shared facility with respect and conserve consumables like paper and ink whenever possible.
6. *Transmission of Course Materials*. Students are not authorized to replicate, reproduce, copy or transmit lectures and course materials presented, or derivative materials including class notes, for sale or free distribution to others without written consent of the instructors who are the original source of the materials.