



BISC 580: Readings in Marine and Environmental Biology

Units: 2

Fall 2024—Tuesday 10-11:30 AM

Location: AHF 259

Instructors:

Professor Eric Webb

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Course Description

This course is designed to (1) to hone your critical reading and reviewing skills, and (2) develop the art of giving a great scientific presentation. We'll focus on key papers that have shaped Marine and Environmental Biology (MEB). This course consists of **one part journal club and reviewing and one part presentation**: We will read papers in MEB and critique them to discuss the art of science presentation. Everyone will provide a review of each paper. This review will aid in the discussion during class. You will hone the art of distilling a scientific paper by leading a journal club presentation for one paper.

Learning Objectives

After this course, you will be able to:

- Put work in MEB into a global perspective of the fields we work in by reading foundational papers.
- Distill a paper to its “essence” quickly.
- Constructively critique papers, scientific writing and data presentation
- Recognize the general elements of effective figures in science manuscripts and presentations.
- Lead a journal club and interact with the data you are presenting.
- Identify key components of good papers from the literature.
- Provide a good ad hoc review for a manuscript.

Required Readings and Supplementary Materials

The readings for this course will come from the primary literature and will be developed annually in consultation with the faculty in MEB. Readings will be in the form of eBooks and PDFs freely available via the USC library webpage. While many of the new papers will change annually, we'll read these classics every year:

- PAINE R. A Conversation on Refining the Concept of Keystone Species. *Conservation Biology* 1995; **9**: 962-964.
- Paine RT. A Note on Trophic Complexity and Community Stability. *The American Naturalist* 1969; **103**: 91–93.
- Bobay L-M, Ochman H. Biological Species Are Universal across Life's Domains. *Genome Biology and*

Evolution 2017; **9**: 491–501.

- Morgan R, Finnøen MH, Jensen H, Pélabon C, Jutfelt F. Low potential for evolutionary rescue from climate change in a tropical fish. *Proceedings of the National Academy of Sciences* 2020; **117**: 33365–33372.
- Jain C, Rodriguez-R LM, Phillippy AM, Konstantinidis KT, Aluru S. High throughput ANI analysis of 90K prokaryotic genomes reveals clear species boundaries. *Nat Commun* 2018; **9**: 7200.

Description and Assessment of Assignments

You will lead at least one journal club presentation and provide a short one-page review for all papers assigned. There will also be select in-class assignments linked to your participation grade- see below.

Grading Breakdown

Assessment Tool (assignments)	Points	% of Grade
Presentations (1)	40	40
Paper reviews (12)	48 (4 ea.)	48
Participation	12	12
TOTAL	100	100

Participation credits

This portion of the class points will be calculated based on small group activities submitted/presented/performed by the end of class, and peer evaluations.

Assignment Submission Policy

Assignments will be submitted on Blackboard before each class.

Grading Timeline

After the first week overview and expectations class, reviews of papers will be due before each class and the grading will be discussed in the next class.

Course-Specific Policies

1. It may be necessary to make some adjustments in the syllabus during the semester.
2. Disability: Students requesting academic accommodations based on a disability are required to register with the Office of Student Accessibility Services (OSAS) each semester. A letter of verification for approved accommodations can be obtained from OSAS when adequate documentation is filed. Please be sure the letter is delivered to Drs. Schwartzman and Webb as early in the semester as possible. OSAS is open Mon-Fri, 8:30-5:00. The office is in Student Union 301 and their phone number is 213 740-0776
3. Class attendance: Graduate school is a busy time! We understand that you have experiments, travel, and other commitments. Please send an email at least 48 h in advance about absences to Dr. Webb or Dr. Schwartzman, or no credit/makeup assignments will be possible. Please don't be late to class. We'll have a 5-minute grace period, but then to be fair to everyone we will impose a penalty on your class participation for the day. Grading related to in-class activities and participation will be decreased by 50% of possible points for being more than 5 min late to class.
4. Late assignments: Please notify the instructors 48 h in advance if you need to submit an assignment after the due date. Reasonable accommodations will be made if you tell us with at least 48 h notice. If you submit an assignment after the due date, we will give you half of points possible. Example: if your grade is

8/10 you will receive 4/10. Submissions made more than 24 h after the start of class will receive zero credit unless arranged in advance.

Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct contrasts with the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](#). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other examples of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the [student handbook](#) or the [Office of Academic Integrity's website](#), and university policies on [Research and Scholarship Misconduct](#).

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. ([Living our Unifying Values: The USC Student Handbook](#), page 13).

Course Evaluations

Course evaluation occurs at the end of the semester university wide. These are implemented by USC. We take your comments seriously. So, in addition to this standard review, we will have a midsemester evaluation for this course. The input collect from you will be invaluable for "correcting" directions in the course and optimizing your educational experience. Detail will be provided in class in week 7.

Course Schedule (tentative- topics subject to change before the start of the semester)

	Topics/Daily Activities	Readings/Preparation	Deliverables
Week 1	Intro expectations	none	Expectations for the class and rubrics Determine order for paper presentations
Week 2	Life on Earth	Woese CR. On the evolution of cells. <i>Proc National Acad Sci</i> 2002; 99: 8742–8747	Paper Presentation for one student and review due before class for all
Week 3	Keystone species	Paine R. A Conversation on Refining the Concept of Keystone Species. <i>Conservation Biology</i> 1995; 9: 962–964. Paine RT. A Note on Trophic Complexity and Community Stability. <i>The American Naturalist</i> 1969; 103: 91–93.	Paper Presentation for one student and review due before class for all
Week 4	New N	Dugdale RC, Goering JJ. Uptake of new and regenerated forms of nitrogen in primary productivity. <i>Limnol Oceanogr</i> 1967; 12: 196–206.	Paper Presentation for one student and review due before class for all
Week 5	Redfield Ratio	Redfield AC. The Biological Control of Chemical Factors in the Environment. <i>American Scientist</i> 1958; 46: 230A–221.	Paper Presentation for one student and review due before class for all
Week 6	Nutrient limitation	Moore CM et al. Processes and patterns of oceanic nutrient limitation. <i>Nat Geosci</i> 2013; 6: 701–710.	Paper Presentation for one student and review due before class for all
Week 7	Microbial Diversity: species boundaries	Murray CS, et al. Re-evaluating the evidence for a universal genetic boundary among microbial species. <i>Nat Commun</i> 2021; 12: 4059. Rodriguez-R LM, et al. Reply to: “Re-evaluating the evidence for a universal genetic boundary among microbial species”. <i>Nat Commun</i> 2021; 12: 4060.	Paper Presentation for one student and review due before class for all
Week 8	Fall recess		No assignments
Week 9	Microbial Diversity: physiology	Myers, Charles R., and Kenneth H. Nealson. "Bacterial manganese reduction and growth with manganese oxide as the sole electron acceptor." <i>Science</i> 240.4857 (1988): 1319-1321. Wolfe-Simon, Felisa, et al. "A bacterium that can grow by using arsenic instead of phosphorus." <i>Science</i> 332.6034 (2011): 1163-1166.	Paper Presentation for one student and review due before class for all

Week 10	Microbial Diversity: communities and interactions	Goffredi, Shana K., et al. "A dynamic epibiont community associated with the bone-eating polychaete genus <i>Osedax</i> ." <i>mBio</i> (2023): e03140-22.	Paper Presentation for one student and review due before class for all
Week 11	Competition and coexistence	Hutchinson GE. The Paradox of the Plankton. <i>Am Nat</i> 1961; 95 : 137–145.	Paper Presentation for one student and review due before class for all
Week 12	Tropical Fish and Climate change	Morgan R, et al Low potential for evolutionary rescue from climate change in a tropical fish. <i>Proceedings of the National Academy of Sciences</i> 2020; 117 : 33365–33372.	Paper Presentation for one student and review due before class for all
Week 13	Oceanic Biodiversity	Worm B, Barbier EB, Beaumont N, Duffy JE, Folke C, Halpern BS, et al. Impacts of Biodiversity Loss on Ocean Ecosystem Services. <i>Science</i> 2006; 314 : 787–790.	Paper Presentation for one student and review due before class for all
Week 14	Thanksgiving Break		No assignments
Week 15	Extinctions	Alan Pounds J, et al. Widespread amphibian extinctions from epidemic disease driven by global warming. <i>Nature</i> 2006; 439 : 161–167.	Paper Presentation for one student and review due before class for all