



BISC 580: Readings in Marine and Environmental Biology

Units: 2

Fall 2024—Tuesday 10-11:30PM

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 important to 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 two papers.

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.
- Understand what gives papers staying power and modern relevance
- Provide a good ad hoc review for a manuscript.
- Give a chalk talk.

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. While many of the new papers will change annually, we'll read these classics every year:

- Paine RT. *Conservation Biology* 1995; **9**: 962-964.
- Paine RT. *The American Naturalist* 1969; **103**: 91–93.
- Morgan R, et al. *Proceedings of the National Academy of Sciences* 2020; **117**: 33365–33372.
- Jain C, et al. *Nat Commun* 2018; **9**: 7200.

Readings will be in the form of PDFs freely available via the USC library webpage. You can also navigate to the paper and paste the following javascript into your navigation bar to gain access to a paper through the university library system:

javascript:void(location.href='https://libproxy.usc.edu/login?url='+location.href)

Description and Assessment of Assignments

You will lead at least one journal club presentation per semester. Journal club presentation guidelines will be provided on the first day of class. For every class, you will prepare a short one-page review for all papers assigned, following prompts provided. There will also be a final assessment, see below:

Final chalk talk

Giving an informal talk with just a whiteboard and a marker is an important scientific communication skill that you will need as you progress in your career. The ability to clearly explain concepts without slides takes practice! For your final examination you will be asked to identify a paper that interests you, then identify one key takeaway from that paper you want to tell the class about. You'll prepare notes for a 10-minute chalk talk that you'll share with the class during Finals week. Everyone- instructors and students- will give feedback on the chalk talk presentation.

Grading Breakdown

Assessment Tool	Points	% of Grade
Presentation (2)	22	22
Paper reviews (14)	56 (4 for each paper)	56
Final- chalk talk	22 (4 pts for paper choice + 18 for final presentation)	22
TOTAL	100	100

Assignment Submission Policy and Grading Timeline

Paper reviews will be submitted on Blackboard before each class. Paper reviews submitted after the start of class will receive half credit. Reviews submitted later than 24 h after the class session where the paper was discussed will receive no credit. Please see course specific policies for accommodations in the case where you will be absent from a class. Notes on grading/feedback from instructors will be discussed briefly at the beginning the next class.

Course-Specific Policies

1. It may be necessary to make some adjustments in the syllabus during the semester.
2. Class attendance: We expect you to let us know 48 h in advance for planned absences. We will always accommodate emergencies. Otherwise, if you have an unplanned absence, please still submit your paper review on time - we will give you ½ of credit you would have otherwise earned.
3. Late policy: We'll have a 5-minute grace period, after which you are late to class. To be fair to everyone if you frequently arrive late to class, we'll deduct point(s) from your paper review depending on how late you are and how often it happens. Please don't make us do this!
4. Late assignments: Submissions made after the start of class and up to 24 h after class will receive ½ credit. Submissions made more than 24 h after the start of class will receive zero credit.
5. 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 collected 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

	Topics/Daily Activities	Readings/Preparation ahead of class	Deliverables	Faculty Contact
W1 8/27	Intro expectations	<p>Review papers ahead of class, identify any known absences or accommodations.</p> <p>Wolfe-Simon, et al. "A bacterium that can grow by using arsenic instead of phosphorus." <i>Science</i> 332.6034 (2011): 1163-1166.</p> <p>Prior to class:</p> <ol style="list-style-type: none"> 1. Go to the Science webpage and look at the correspondence associated with this paper. What is going on here? 2. Do a Google Scholar search, find articles citing the assigned paper in 2024, look at how the paper is cited. Do you agree with how the paper is being cited? 	<p>-Expectations for the class and journal club presentations</p> <p>Class discussion:</p> <ul style="list-style-type: none"> -Authorship and guidelines for reading papers -Risk and reward of weeklies vs society journals -What do statistics linked to citation # (like impact factor) tell us? <p>Homework:</p> <ul style="list-style-type: none"> -Sign up to present paper 	
W2 9/3	Life on Earth	<p>Paper to review: Woese CR. On the evolution of cells. <i>Proc National Acad Sci</i> 2002; 99: 8742–8747</p> <p>Also read: Forterre, Patrick. "The universal tree of life: an update." <i>Frontiers in microbiology</i> 6 (2015): 717.</p>	<p>Paper Presentation for one student and review due before class for all</p> <p>-How do you find a good review?</p>	EAW
W3 9/10	By the numbers	<p>Paper to review: Bar-On, Phillips, and Milo. "The biomass distribution on Earth." <i>Proceedings of the National Academy of Sciences</i> 115.25 (2018): 6506-6511.</p> <p>Also read: Phillips, Rob, and Ron Milo. "A feeling for the numbers in biology." <i>Proceedings of the National Academy of Sciences</i> 106.51 (2009): 21465-21471.</p>	<p>Paper Presentation for one student and review due before class for all</p>	JAS
W4 9/17	Microbial diversity	<p>Hug, Laura A., et al. "A new view of the tree of life." <i>Nature microbiology</i> 1.5 (2016): 1-6.</p>	<p>Paper Presentation for one student and review due before class for all</p>	EAW
W5 9/24	Climate change and	<p>Parmesan, C., Ryrholm, N., Stefanescu, C. <i>et al.</i> Poleward shifts in geographical ranges of</p>	<p>Paper Presentation for one student and</p>	JAS

	species adaptability	butterfly species associated with regional warming. <i>Nature</i> 399 , 579–583 (1999). https://doi.org/10.1038/21181	review due before class for all	
W6 10/1	BiogeoChem	Waterbury, JB et al “Widespread Occurrence of a Unicellular, Marine, Planktonic, Cyanobacterium.” <i>Nature</i> 277 , no. 5694 (January 1979): 293–94. Chisholm et al 1988 A novel free-living prochlorophyte abundant in the oceanic euphotic zone. <i>Nature</i> 334 , no. 6180 (July 1988): 340–43.	Paper Presentation for one student and review of both papers due before class for all	EAW
W7 10/8	Keystone species	Also read: Paine R. A Conversation on Refining the Concept of Keystone Species. <i>Conservation Biology</i> 1995; 9 : 962–964. Paper to review: 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	JAS
W8 10/1 5	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	EAW
W9 10/2 2	Deep biosphere	Biddle, Jennifer F., et al. "Heterotrophic Archaea dominate sedimentary subsurface ecosystems off Peru." <i>Proceedings of the National Academy of Sciences</i> 103.10 (2006): 3846–3851.	Paper Presentation for one student and review due before class for all	JAS
W10 10/2 9	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	EAW
W11 11/5	Evolution of novelty	Gavelis, G., Hayakawa, S., White III, R. <i>et al.</i> Eye-like ocelloids are built from different endosymbiotically acquired components. <i>Nature</i> 523 , 204–207 (2015). https://doi.org/10.1038/nature14593	Paper Presentation for one student and review due before class for all	JAS
W12 11/1 2	Extracellular electron carriers	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.	Paper Presentation for one student and review due before class for all	EAW

W13 11/1 9	Allometric scaling	Litchman, E., C. A. Klausmeier, and K. Yoshiyama. "Contrasting size evolution in marine and freshwater diatoms." <i>Proceedings of the National Academy of Sciences</i> 106.8 (2009): 2665-2670.	Paper Presentation for one student and review due before class for all	JAS
W14 11/2 6	Microbial Diversity: species boundaries	Jain C, Rodriguez-R LM, Phillippy AM, Konstantinidis KT, Aluru S. High throughput ANI analysis of 90K prokaryotic genomes reveals clear species boundaries. <i>Nat Commun</i> 2018; 9: 7200.	Paper Presentation for one student and review due before class for all	EAW
W15 12/3	Eukaryogenesis	Coale, Tyler H., et al. "Nitrogen-fixing organelle in a marine alga." <i>Science</i> 384.6692 (2024): 217-222.	Paper Presentation for one student and review due before class for all	JAS
W16 12/1 2 11- 1p. m.	FINAL *Note different day/time*	<u>Final Activity</u> – find a new paper that you like and why it should be in next year's class + present a 10 min chalk talk on a key finding from that paper.		

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 is prohibited, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Awareness of these recordings 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 is prohibited. 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).

Statement on Academic Conduct and Support Systems

Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, compromises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

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

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity 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](#).

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as

possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

[Counseling and Mental Health](#) - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

[988 Suicide and Crisis Lifeline](#) - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

[Relationship and Sexual Violence Prevention Services \(RSVP\)](#) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

[Office for Equity, Equal Opportunity, and Title IX \(EEO-TIX\)](#) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

[Reporting Incidents of Bias or Harassment](#) - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

[The Office of Student Accessibility Services \(OSAS\)](#) - (213) 740-0776

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

[USC Campus Support and Intervention](#) - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

[Diversity, Equity and Inclusion](#) - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

[USC Emergency](#) - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

[USC Department of Public Safety](#) - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

[Office of the Ombuds](#) - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

[Occupational Therapy Faculty Practice](#) - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.