# University of Southern California

### ****BISC 530:**** Advanced Seminar in Plankton Biology (2 units)

Focus Area:

Plankton community structure and dynamics in marine and freshwater systems, with an emphasis on eukaryotic plankton.

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# Instructors:

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| Dr. Dave CaronE-mail: dcaron@usc.eduPhone: (213) 740-0203Office: AHF 301 | Dr. Karla HeidelbergE-mail: kheidelb@usc.eduPhone: (213) 740-0951Office: SOS B15 |

# Class Meeting Time: Tuesday’s 2:00-4:00pm (location TBD)

Readings: Published primary literature posted on course blackboard site (varies from year to year).

 For those lacking background – readings in basic invertebrate biology text recommended.

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### Course Description

This course is consistent with the General Department of Biological Sciences learning objectives. <https://dornsife.usc.edu/bisc/learning-objectives/>

The goal of BISC 530 provides an overview of the major organismal groups inhabiting plankton ecosystems. The course emphasizes the morphologies, life histories and trophic activities and relationships among these taxa. Lectures, laboratory activities and field trips are designed to expose students to the breadth of planktonic organisms.

The course structure reflects student-identified recommendations for combined field and laboratory-based learning that is common in biological oceanography and environmental science. Lectures will provide overviews of the biology and ecology of major plankton lineages (bacteria, phytoplankton/protozoa, and micro-, meso- and macrozooplankton), methodology for studying these assemblages and their activities, and our present state-of-knowledge regarding food web structure and biogeochemical significance. The field component of the course will focus on hands-on experience with various planktonic groups, and a comparative study of plankton communities from different systems. We will examine the similarity and uniqueness of environments with respect to the dominant taxonomic groups, trophic structure and overall biological processes.

There will be a weekend field trip to the Wrigley Institute on Catalina Island with a strong emphasis on methodology and sample analysis.

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| **Date** | **Topic** |
| Aug 23 | 1. Introduction and overview (DC/KH) |
| Aug 30 | 2. Prokaryotic & eukaryote phototrophs (DC) |
| Sept 6 | 3. Bacteria and viruses (DC) |
| Sept 13 | 4. Micro(protistan) zooplankton (DC) |
| Sept 20 | 5. Genomic enabled studies of prokaryotes and protists (KH) a. Phylogenetics & molecular clocks b. Whole-genome sequences and transcriptomics  c. Environmental genomics (the meta-omics)  |
|  | 6. Intro to the metazoa plankton; Crustacea, part 1 (DC) |
| Sept 27 | 7. Crustacea, part 2 (KH) |
| Oct 4 | 8. Chordates (Salps, doliolids, larvaceans) and Demersal Plankton (KH) |
| Oct 11 | 9. Chaetognaths, molluscs, polychaetes (KH) |
| Oct 18 | 10. Special topics in plankton biology - Climate Change (KH) |
| Oct 25 | 11. **Mid-term exam**  |
| Oct 21-23 | **Plankton Boot Camp weekend (Wrigley Marine Science Center)** |
| Nov 1 | Student Group Presentation and Discussion from Plankton Boot Camp  |
|  | 12. Special topics in plankton biology - Symbiosis (DC) |
| Nov 8 | 13. Special topics in plankton biology - Harmful algal blooms (DC) |
| Nov 15 | 14. Special topics in plankton biology – Effects of Eutrophication. Putting the pieces together as a case study (KH)  |
| Nov 22 | 15. Student presentations |
| Nov 29 | 16. Student presentations |
| Final Exam | **Thursday Dec 8, 2:00-4:00 (Location TBD)** |

Course schedule

**Requirements:**

Attendance: Students are required to attend all lectures and the weekend field trip. Opportunities for fieldwork will integrate knowledge learned in class and are considered an essential part of the course. The WMSC field trip weekend is integral to the entire course. Students will participate in sampling in both marine and freshwater systems in and around Catalina Island. The samples will be analyzed during the weekend. The class will self-organize into specific groups that highlight aspects of the dataset they feel are important as a group for a overall presentation that is divided into sub-topic presentations (with overall intro and conclusion sections). A group presentation will included integrated themes and coordinated data analysis. This has worked remarkable well in past years.

**Evaluation:**

Final Exam: There will be an assigned oral report and a final exam, incorporating material from lectures, discussions, laboratory exercises and reading assignments.

Field and lab work data collection and analysis (30%)

Group data presentation (15%)

Individual research presentation (15%)

Final Exam (30%)

Class and field participation (10%)

**Policies:**

1. Academic honesty and integrity are paramount characteristics! Dishonesty in any form is not tolerated.

2. The Final Exam date and time is set by the University and is firm. If a student misses an exam due to a true emergency (with an acceptable documentation), a make-up exam will be scheduled. The Final Exam date and time are set by the University and cannot be changed (http://www.usc.edu/academics/classes/term\_20113/finals.html)

3. Re-grading of exams: Exams submitted for possible re-grading must be turned in to the instructor with a written concise explanation of the problem, and will be accepted only within one week of when the exam is returned to the student.

4. No special assignments for extra credit are given.

5. Exams will be returned after grading. Unclaimed exams will be kept for one semester.

6. Challenges to the final grade must be made within 6 weeks after final grades are assessed.

7. Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) in the Fall 2011 semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to instructors as early in the semester as possible.