

**BISC 121Lg**  
**Advanced General Biology: Organismal Biology and Evolution**  
**~ Fall Semester 2020 ~**

Course Overview: BISC 121Lg is an advanced introductory course that will expose students to the breadth of biological diversity, evolution, and environmental biology. The course is designed to provide relatively even coverage of all major taxonomic groups, providing an evolution-based description of form and function, and an overview of ecology, behavior, population genetics, and conservation biology.

Lecturer: **David Hutchins, Ph.D.**, AHF 207, 213 740-5616, [dahutch@usc.edu](mailto:dahutch@usc.edu)

“Zoom chat” Office Hours: 11:30-12:30 MW, or by appointment

**Jed Fuhrman, Ph.D.**, AHF 211, 213 740-5757, [fuhrman@usc.edu](mailto:fuhrman@usc.edu)

“Zoom chat” Office Hours by appointment

Lab Manager: **Gorjana Bezmalinovic**, ZHS 362, 213-740-6078, [bezmalin@usc.edu](mailto:bezmalin@usc.edu)

Office Hours: ‘Zoom chat’ available upon request

Lab Instructors: Benjamin Flanagan, Guilherme De Sena Brandine, Chuankai Cheng

Required Textbooks:

Lecture: **Campbell Biology**, Reece et al., 11<sup>th</sup> edition, 2016.

Laboratory: All the materials will be posted on Blackboard.

Website: <https://blackboard.usc.edu/> (for detailed class notes, announcements and grades—you will want to check this website regularly)

Grading: Final grades are assigned on a curve, determined entirely by the total number of points earned on lecture exams and in the laboratory. See the **Course Contract** posted on Bb for more details. After each exam a curve will be published to indicate roughly what letter grade corresponds to each student’s current number of points. **Only the total number of points earned by the end of the course will determine the final grade.**

Exam Schedule:

Exam 1: Friday, Sep 11 (10:00 – 10:50 AM)

Exam 2: Friday, Oct 2 (10:00 – 10:50 AM)

Exam 3: Friday, Oct 23 (10:00 – 10:50 AM)

Exam 4: Monday, Nov 23 (8:00 – 8:50 AM)

Lecture Quizzes:

There will be 12 multiple choice quizzes to be completed on Blackboard during the semester. The quizzes will be posted approximately 11:00 A.M. on Fridays and will remain available until 9:00 A.M. the following Monday. First Bb quiz will be posted on Aug 21<sup>st</sup>.

**For policies on re-grading and missed exams, refer to Course Contract available on the course website.**

Students with Disabilities: Any student requesting academic accommodations based on a disability is required to register with the Office of Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Be sure that the letter is delivered to the laboratory director as early in the semester as possible, preferably by September 4, 2020. DSP is located in GFS 120 and is open 8:30-5:00, Monday through Friday. The telephone number for DSP is 213-740-0776.

**Lecture schedule:**

Date	Lecture Topic	Campbell Biology 11 <sup>th</sup> Ed.	Lecturer	Lecture Number
Aug 17	Introduction	Ch.14,15,16*	Hutchins	1
19	Darwinian Evolution: Concepts & Background	Ch. 22, 23	Hutchins	2
21	Evolution: The Modern Synthesis	Ch. 22	Hutchins	3
Aug 24	Micro/Macroeolution: Evolutionary Processes		Hutchins	4
26	Microevolution	Ch. 24	Hutchins	5
28	Macroeolution, the Species Concept, Speciation	Ch. 24	Hutchins	6
Aug 31	Zoonotic diseases (Whole Class Disc.)	-	Hutchins	7(Discussion))
Sep 2	Phylogeny, Systematics, The Tree of Life	Ch. 26	Hutchins	8
4	Unicellular Eukaryotes: Protists II	Ch. 26	Hutchins	9
Sept 7	<b>Labor Day</b>			
9	Unicellular Eukaryotes: Protists II	Ch. 28	Hutchins	10
11	<b>1<sup>st</sup> EXAM</b>			Exam 1
Sep 14	Fungi Phylogeny and Ecology	Ch. 31	Hutchins	11
16	Animal Diversity	Ch. 32	Hutchins	12
18	De-extinction (Whole Class Discussion)		Hutchins	13
Sept 21	Invertebrates I	Ch. 33	Hutchins	14
23	Invertebrates II	Ch. 33	Hutchins	15
25	Chordates	Ch. 34	Hutchins	16
Sept 28	Vertebrates: Mammals and Birds	Ch. 34	Hutchins	17
30	Vertebrates: Primates & Hominid Evolution	Ch. 34	Hutchins	18
Oct. 2	<b>2<sup>ND</sup> EXAM</b>			Exam 2
Oct 5	Origins of Life	Ch. 25	Fuhrman	19
7	Virus Introduction	Ch. 19	Fuhrman	20
9	Viruses and Prokaryotic Genetics	Ch. 18.1, 27	Fuhrman	21
Oct 12	Prokaryote Structure, Function, Metabolism	Ch. 27	Fuhrman	22
14	Prokaryote Diversity and Ecology	Ch. 27	Fuhrman	23
16	Land Plants 1	Ch. 29	Fuhrman	24
Oct 19	Land Plants 2	Ch. 30	Fuhrman	25
21	Elements of Plant Structure and Function	Ch. 35-39 (concepts only)	Fuhrman	26
23	<b>3<sup>RD</sup> EXAM</b>		Fuhrman	Exam 3
Oct 26	Behavioral Biology	Ch. 51	Fuhrman	27
28	Introduction to Ecology	Ch. 52	Fuhrman	28
30	Population Ecology	Ch. 53	Fuhrman	29

Nov 2	Community Ecology	Ch. 54	Fuhrman	30
4	Community Ecology	Ch. 54	Fuhrman	31
6	Ecosystems	Ch. 55	Fuhrman	32
Nov 9	Ecosystems	Ch. 55	Fuhrman	33
11	Conservation Biology and global change	Ch. 56	Fuhrman	34
13	Conservation Biology and global change	Ch. 56	Fuhrman	35
<b>Nov 23</b>	<b>4<sup>TH</sup> EXAM (non-cumulative FINAL)</b>			Last Exam

**NOTES:** \* Indicates chapters that students should read and/or review, especially if they have little or no prior familiarity with genetics. This syllabus may be subject to minor changes, which will be announced in class.

**NOTES:** Professors' lectures will be in synchronous, and recorded, online via Blackboard and/or Zoom, and supplemented with PDF or PowerPoint documents posted in advance for download on the class web site (<https://blackboard.usc.edu/>). The lecture files will generally be available a few days prior the respective lecture under *Course Documents*.

This syllabus may be subject to minor changes, which will be announced in class & posted on Blackboard. Again, it is YOUR RESPONSIBILITY to check the <https://blackboard.usc.edu/> website frequently.

Please check your grades on Blackboard frequently (on your *My USC* home page click on *View Grades* in the *Tools* box); all corrections to grades must be completed PRIOR to the lecture final. Please notify your TA and the laboratory manager of the error and follow-up that it is corrected in a timely manner.

Please note your final exam schedule as soon as soon you can! You must have 3 or more documented final exams on the same day to warrant a final exam day change. If you have the required 3 finals on the same day, bring your documentation to the laboratory manager for approval in the beginning of the semester.

Please consult the Course Contract for further information on switching laboratories, exams, and how to handle class before the big game, holiday, etc.

This Syllabus may change – please check Blackboard regularly. Significant changes will also be announced.

### **Statement on Academic Conduct and Support Systems**

#### **Academic Conduct:**

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

## Support Systems:

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

[studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)

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

*National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call*

[suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

*Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call*

[studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

*Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298*

[equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

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*

[usc-advocate.symlicity.com/care\\_report](http://usc-advocate.symlicity.com/care_report)

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

*The Office of Disability Services and Programs - (213) 740-0776*

[dsp.usc.edu](http://dsp.usc.edu)

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

*USC Campus Support and Intervention - (213) 821-4710*

[campussupport.usc.edu](http://campussupport.usc.edu)

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

*Diversity at USC - (213) 740-2101*

[diversity.usc.edu](http://diversity.usc.edu)

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*

[dps.usc.edu](http://dps.usc.edu), [emergency.usc.edu](http://emergency.usc.edu)

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) 442-120 – 24/7 on call*

[dps.usc.edu](http://dps.usc.edu)

Non-emergency assistance or information.

**BISC 121 LABORATORY SYLLABUS**  
**FALL 2020**

**Lab Manager:** Gorjana Bezmalinovic  
[bezmalin@usc.edu](mailto:bezmalin@usc.edu)  
Office hours: 'Zoom chat' upon email request

**OPTION A:**

Laboratory Schedule for sections 13190, 13191, 13193, 13194 and 13195:

Lab #	The Week Of	Laboratory
1	Aug 17	Lab Safety
2	Aug 24	Mendelian Inheritance*
3	Aug 31	Experimental Design / Scientific Reading
4	Sep 7	Evolution*
5	Sep 14	CRISPR / Journal Club I
6	Sep 21	Invertebrate Model System ( <i>C. elegans</i> )
7	Sep 28	Regeneration
8	Oct 5	Bacteria/The Gram Stain*
9	Oct 12	Plants* / Journal Club II
10	Oct 19	Trophic Levels/Food webs
	Oct 26	Marine Biology / Eutrophication
	Nov 2	LAB EXAM
	Nov 9	Biodiversity Conservation Presentation









Some minor changes might occur during the semester.

\* Exercise for which 5-7 pages, typed lab report is required.

\* Exercise for which there is a homework assignment.

**LABORATORY POINT DISTRIBUTION for OPTION A**

The laboratory portion (**370 points**) will count for **~37%** of your final course grade, distributed as follows:

-  Lab activities (virtual labs) – 120 pts (12 x 10)
-  Homework/post-labs – 35 pts
-  Scientific Reading – 15 pts
-  Journal Club – 20 pts
-  Lab Report – 40 pts
-  Lab Report Peer Review – 10 pts
-  Biodiversity Conservation Presentation – 30 pts
-  Lab Exam – 100 pts

[Guidelines below refer to the OPTION A labs.](#)

## LAB SCORES

Scores for all the lab assignments will be posted on Blackboard – <https://blackboard.usc.edu/>, under your **LAB SECTION**. It is the student's responsibility to immediately notify their Lab Instructor or Lab Manager in the event of any mistakes, so please check your Blackboard scores weekly.

## LABORATORY ATTENDANCE

You are required to attend your Lab Instructor's '**Zoom lab sessions**' during the scheduled lab time. Those who cannot be present due to time zone constraints will be excused and will be able to watch the recordings. It is a student's responsibility to follow up with their Lab Instructor if they have any questions related to specific virtual lab activities.

## LABSTER VIRTUAL LABS

You will be required to do virtual lab simulations. You will be asked questions throughout the virtual lab activities and your scores will be transferred to Blackboard (Bb) after you complete each lab.

## HOMEWORK / POST-LAB ASSIGNMENTS

You will have several homework/post-lab assignments, based on the material you learned in the lab, or data obtained in your lab experiments. Assignments will be posted on Bb.

## PRE-LAB ASSIGNMENT – SCIENTIFIC READING

You will have to read a peer-reviewed scientific paper and answer questions on Bb before you come to lab. You are expected to participate in a lab discussion of the paper with your lab instructor and your labmates.

## LAB REPORT

After one of the lab activities you will have to write a scientific lab report. Lab report guidelines will be posted on Bb in the beginning of the semester. Lab report will be submitted on Blackboard through the [turnitin link](#).

## LAB REPORT PEER REVIEW

Each student will review one of their lab-mates' lab reports. Instructions will be posted on Blackboard once the semester starts.

## JOURNAL CLUB:

Dr. Hutchins and Dr. Fuhrman will each lead a journal club discussion of one peer-reviewed scientific paper related to the course lecture material. You are responsible for reading and understanding the scientific papers and you are each expected to participate actively in the discussion of the papers during journal club.

## BIODIVERSITY CONSERVATION PRESENTATION

This assignment will be done in pairs. You will have to prepare a presentation about an endangered species or a disappearing habitat and share it with your labmates through Zoom. Detailed guidelines will be posted on Bb.

## LAB EXAM

The cumulative lab exam will test your understanding of the topics, concepts and activities covered during the entire semester. This 90-minute test will be administered on Bb. It will consist of multiple-choice questions, T/F, fill in the blanks, matching and short answers.

It is your responsibility to take the lab exam during the scheduled exam time.

- If you miss a lab exam due to a serious illness, you must present a valid excuse to the Lab Manager ([bezmalin@usc.edu](mailto:bezmalin@usc.edu)) **within 24 hours** of the missed exam. A valid excuse is considered to be an official note from your doctor, or the summary of your visit from the USC Student Health Center. Note that neither you, nor your doctor, need to tell us the nature of your illness – we just want to verify whether you were too ill to take the exam.
- If you miss an exam for non-illness related reasons, you must provide similarly convincing documentation of the emergency to the Lab Manager within 24 hours. If we judge your excuse to be valid, you will be allowed to take the make-up lab exam. If you do not have a valid excuse or fail to provide it within the allotted time, you will receive a zero.
- Students who miss a lab exam due to the observance of a religious holy day should be aware of the University's policy on such absences, published at: <http://orl.usc.edu/religiouslife/holydays/absences.html>. Requests for such absences should be made by email addressed to the Lab Manager ([bezmalin@usc.edu](mailto:bezmalin@usc.edu)) at least 2 weeks in advance of the absence. If the absence is approved, the student will be allowed to take the make-up lab exam.
- Student-athletes who will have to miss the lab exam due to a previously scheduled NCAA competition should bring the SAAS excuse letter to the Lab Manager at least 2 weeks in advance so alternatives can be arranged.

## LAB SCORE NORMALIZATION

The lab scores will be normalized at the end of the semester by the Lab Manager to correct for differences in grading between Lab Instructors/TAs.

## STUDENTS WITH DISABILITIES

Students requesting academic accommodations based on a disability are required to register with the Office of Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Be sure that the letter is delivered to the Laboratory Manager as early in the semester as possible, [preferably by Sep 4, 2020](#). DSP is located in GFS 120 and is open from 8:30 a.m. to 5:00 p.m., Monday through Friday. Their telephone number is 213-740-0776. If a student's approved accommodation is limited to extra time on exams, the teaching staff of BISC 120 will provide the accommodation. For any other accommodation, such as a private room, reader or a scribe, students must make prior arrangements with the DSP office 2 weeks before the exam date. For more information please visit the following website: [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html).

## OPTION B

### SEA-PHAGES LAB (section 13192 only)

*Course Overview* This course offers students an opportunity for a mentored research experience where they will learn how to apply the scientific method to make new discoveries and contribute to scientific knowledge.

A previously isolated phage genome that was sequenced by Howard Hughes Medical Institute will be provided to our lab section. Students will develop their research experience by learning how to annotate the genome of this phage. They will compare the genes identified in their phage to other phages that have been sequenced by the SEA-PHAGES program in order to appreciate the diversity of actinobacteriophages. At the end of the semester each student will be included as a co-author when the genomes are submitted to GenBank. Students in the course are part of the National Research Initiative funded by the Howard Hughes Medical Institute.

This class won't be like other classes you've taken or may take. There will be minimal lecturing by faculty, and we will instead utilize class time to do research and discuss scientific concepts relevant to our work. This course is an inquiry-guided learning experience, and it is meant to be students' first mentored research project. Some gene calls are more difficult than others, and sometimes there is no "correct answer." Students will be challenged to make the best calls they can with the current information that is available.

### *Faculty*

Name	Email	Office	Office hours
Christa Bancroft	<a href="mailto:cbancrof@usc.edu">cbancrof@usc.edu</a>	ZHS 472	TBD
Rory Spence	<a href="mailto:rspence@usc.edu">rspence@usc.edu</a>		TBD

### *Section Meeting Times*

Section Meeting Times	Section/Course Number	Instructors	Emails
Tuesday 11:00 – 1:50 PM	13192	Christa Bancroft Rory Spence	<a href="mailto:cbancrof@usc.edu">cbancrof@usc.edu</a> <a href="mailto:rspence@usc.edu">rspence@usc.edu</a>

*Textbook* No textbook is required. The required readings for the course include the SEA-PHAGES Bioinformatics Guide, content unique to this course, and recently published papers on the course topic. They will be available on Blackboard.



### *Blackboard*

Course materials and announcements will be posted on Blackboard. You are expected to check regularly for lecture notes, assignments, announcements, and other material. Main communication with the class will be via Blackboard announcements. If you need help accessing BB, contact the computer help desk at 213-740-5555.

### *Course Policies*

**Attendance is mandatory for each lab session and there will be no make-up labs.** BISC 121L SEA-PHAGES section is an authentic, research-based course, so making regular progress on your research project is dependent on regular lab attendance and group work. Any absence must be properly excused by a healthcare provider for an illness or a University official for University business. If a class is missed due to technology problems, please contact the lab instructors via email as soon as possible to determine the best way to make up the lab session and group work.

### *Objectives*

At the end of the course, students will be able to:

- a) Use a variety of computational software to correctly identify genes in phage genomes that produce functional biological macromolecules in bacteriophages.
- b) Describe basic bacteriophage genome properties and how genes of known function work in the phage life cycle.
- c) Appreciate the diversity of phage genomes and discuss how little is currently known about the functions of most phage genes.
- d) Read and assess primary literature and discuss what is currently known about phage biology and gene function.
- e) Submit finished gene calls in a timely and complete fashion.
- f) Clearly and concisely communicate scientific findings to others during group discussions, class presentations, and through a scientific laboratory report.
- g) Undergraduate students will present a research poster that summarizes our research findings and present this work to members of the university.

### *Grading*

Laboratory point distribution (370 points):

<b>Lab Notebook</b>	60 pts (15 x 4)
<b>Assignments and Quizzes</b>	60 pts (12 x 5)
<b>Genome Annotation</b>	120 pts
<b>Peer Review of Annotation</b>	20 pts
<b>Poster Project</b>	60 pts
<b>Journal Article Presentation</b>	50 pts

**Assignments and Quizzes** – there will be assignments due throughout the term that will assess your overall understanding of the course objectives. Some may be given during class and some may be assigned as out-of-class work. Many of these are written into the course schedule, but additional assignments may arise and due dates may be adjusted throughout the semester. Unless otherwise noted in the course schedule, all assignments are due at the beginning of class. Any assignment handed in late will be docked 10% and will not be accepted after two days late without special permission from the instructor. Pre-lab assignments, such as quizzes and pre-lab notebook entries, are considered to be essential

preparation for lab activities and will not be accepted late. Please note that arriving late to class or being absent for any reason does not alter the due date for any assignment.

**Genome annotation** – Students will work in teams to complete a thorough annotation of a bacteriophage genome. This group project will take several weeks to complete.

**Lab Notebook** – Students are required to use Google Docs or Google Sheets to maintain an electronic notebook that can be shared with your group and the instructors. Documenting your work in the lab is an essential part of developing your skills as scientists. Whenever possible you are expected to prepare your lab notebook with the title, objective, explanation, and protocol for the day's work. We will do the majority of data collection and analysis during the lab period. The notebooks are timestamped by the electronic notebook provider allowing the instructor to see when your work was completed. While we strongly encourage scientific discussions with your peers, your assignments and analysis of experiments in your notebook must be your own work.

**Final Project and Poster** – Students will be working in groups to collect data and analyze experiments. At the end of the semester, each group will assemble a scientific poster to be displayed in the Biological Sciences department and can be presented at a later time at the undergraduate research symposium.

### **Names/Nicknames and Pronouns**

Course rosters are provided to instructors by the University with students' legal names as they were originally provided to the University, but we want to be sure that we are addressing you properly. We will gladly honor your request to be addressed by an alternate name or gender pronoun(s) that differ from your official University records. Please let us know of this early in the semester so that we can update our records.

### **Email Policy**

University addresses will be used for all email correspondence. Please remember that emails are a professional correspondence and write them accordingly. Every attempt will be made to respond to emails within 24 hours of receiving them during the week. Email response during the weekend may take up to 48 hours for a response.

Students should also read e-mail sent to their University account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications.

### **Assignment Re-Grading Policy**

You may request a re-grade of any portion of an assignment by submitting your request in writing and explaining why you think the grading was in error. You must include a detailed justification for the correctness of your answer, including references to the text used in the course (text, page, paragraph). This request must be submitted to the instructor within one week (5 business days) after the date the assignment is returned/grade is posted to Canvas. Unless the re-grade is due to an additional error, please be aware that your entire assignment may be reevaluated and any question that was graded incorrectly (in your favor) may also be re-graded resulting in points deducted from your total. Re-grading requests raised beyond a week after an assignment