Instructor: Jane Shevtsov
Email: jaia@ucla.edu
Office Hours: Mondays 12:45-1:45 pm, Fridays 4-5 pm, and Sundays 3-4 pm. You can also talk to me or email to set up a different time.
Course Website: https://ccle.ucla.edu/course/view/201C-LIFESCI30A-2

Teaching Assistant (Lab): Masato Koizumi (mkoizumi@ucla.edu)

Course Description: In this course, you will learn how to design, study, and run mathematical models, focusing on models of how biological systems behave. We will begin by learning how to write equations that represent change. We will use such equations to model dynamical processes in ecology, physiology, and other subjects in which quantities change with time. We will then learn to analyze the behavior of these models. Along the way, we will learn the relevant fundamentals from calculus, as well as how to run these models on a computer.

About the Instructors:

- **Jane Shevtsov** is an ecologist who has been working on LS 30 since 2012, co-authoring the textbook and writing almost all the labs. She came to the US from Ukraine with her family at age 7 and is a Bruin herself, having attended UCLA for undergrad. She also enjoys science fiction, Brazilian jiu jitsu and indoor rock climbing (the latter two being on hold for now). Ask her about food webs, networks, or the time she failed the midterm in her first mathematical ecology class.

- **Masato Koizumi** is currently a third-year PhD student in the Department of Mechanical and Aerospace Engineering at UCLA. He received his bachelor's degree in aerospace engineering at the University of California, San Diego in 2016 and his master's degree also in aerospace engineering from UCLA in 2020. His research is in computational mechanics where he uses molecular dynamics and finite element analysis to address the deformation and fracture of soft materials (used for biological and aerospace applications) at the macro and at the nano-scale. His inclination towards computational mechanics grew from his passion for playing baseball. In order to throw fastballs to strike out batters, pitchers must have “sound” mechanics, i.e. how bodies move in a synchronous manner to efficiently transfer force from body to the ball. Unfortunately, Masato did not have sound pitching mechanics, so his fastball suffered, which prompted him to study computational mechanics to understand how muscles (soft materials) contract and deform under high stress. (So much stress is put to test every time you throw a >80 mph!) Also, Masato was fascinated by the aerodynamics involved in nasty breaking balls (change-ups being his favorite) so aerodynamics involving
nasty aircraft maneuvers became something very cool for him. However, his “aerospace engineering talent” was poor since he could not even engineer a paper airplane that could float for a few seconds during one of his many projects at UCSD. Outside of classroom, he is still working on his pitching mechanics, aiming to throw an 85 mph fastball and a nasty aerodynamic change-up as this was his 2020 New Year’s resolution which was unfortunately cut short.


**How the Course will Work:** Because of the COVID-19 pandemic, this course will take place entirely online. We have come up with the following course setup to help you learn while accommodating logistical and health issues. Given the very fluid nature of the current situation, we may make changes in the syllabus if the need arises.

Every week, you will get lecture videos along with some embedded or follow-up questions. These are meant to be your first exposure to the material. You will then have an opportunity to discuss questions and do problems with your instructor and classmates via Zoom. This will occur during the regularly scheduled lecture time (all times PDT); however, if life prevents you from participating in your enrolled section, you can take part in another one. There will also be weekly textbook-based homework assignments, which you will submit via Gradescope. As usual, we encourage you to seek help from instructors, TAs and classmates. To facilitate this, we will use Piazza ([https://piazza.com/ucla/summer2020/lifesciences30a2/home](https://piazza.com/ucla/summer2020/lifesciences30a2/home)) for online discussion and chat, in addition to Zoom office hours held by instructors and TAs.

For labs, you will receive an assignment and one or two intro videos. We will then hold real-time Zoom-based lab sections throughout the week. (You can have Zoom and CoCalc open side by side.) We encourage you to attend your own section, but if you have difficulties doing so, we are happy to provide accommodations.

**Grading:** Grading will use a points-based system. There are two important things to know.

1. Grading is not competitive.
2. You don’t need to earn every available point to get a perfect score.

The point breakdown will be as follows:

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<tr>
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<th>Scheme 1:</th>
<th>Scheme 2:</th>
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<tbody>
<tr>
<td>Activities:</td>
<td>15%</td>
<td>15%</td>
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<tr>
<td>Homework:</td>
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<td>Labs:</td>
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<td>Midterm</td>
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<td>Final exam:</td>
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For several of the above grade categories, it will be possible to earn more points than will count for that category. For example, in the homework category, we are planning on 10 homework assignments, worth 2 percentage points each, for a total of 20 percentage points. However, the whole category is only worth 15 percentage points. (This will be similar for the labs and the activities.) Any excess points that you earn for beyond these 15 percentage points will be halved and added to your final average.

So, for example, if you end up with 17 out of 15 in the homework category, you have exceeded the maximum for that category by 2 percentage points. We'll take 1 percentage point and add it to your final average. This way, you can miss points (or even miss entire homework/lab assignments), and make up for it with “bonus points” from other categories. The “Activities” category will include points you can earn for participating in the weekly lecture and lab sessions (like clicker questions, but via Zoom). It will also include other opportunities to earn points throughout the quarter, such as challenge problems, completing interesting extra readings or videos, or other things.

Activities: The activities will be assigned each week to allow you to practice the skills you are learning from the videos and lectures. It will be graded on correctness, but you will have more than one chance to answer a question. This way, if you get it wrong, you can get immediate feedback as to which topics you need to review.

Part of your activities credit (graded on completion) will be taking notes on the live lectures and any videos you are assigned to watch. The reason is that note-taking helps you process the material, identifying key ideas. Focus on doing that rather than trying to get everything down. It's best to take notes by hand unless you have a disability that prevents you from doing so. You will submit notes via Gradescope.

Homework: The purpose of homework is to give you an opportunity to practice course skills and think about concepts, thereby strengthening your understanding. It is a learning tool, not an evaluation tool. Therefore, homework will be graded on whether you appear to have made a serious effort. That said, it is to your definite advantage to work hard on the homework, as this will help you tremendously on exams. Late homework will be accepted but marked down 10% for each day it is late.

Computing: Throughout this course, we will use a free mathematics software package called SageMath, accessed through the website www.cocalc.com, to explore many of the mathematical concepts and models that we develop. SageMath is based on a very popular and user-friendly programming language called Python. Thus, you will learn some basic programming in this class. No prior programming experience is assumed – all you need is persistence and a willingness to try new things. Any work that you do not complete in lab and any additional exercises can be done at home or in any campus computer lab.

Collaboration and Cheating: You are encouraged to work with other students on homework and labs, but don't copy their work word for word. That's a waste of your time as you don't learn from copying. Also, please list your collaborators (not including instructors). This is standard practice in science and you should start getting used to it now. If you decide to cheat, the primary effect is that you will be a cheater. If caught, you will be
reported to the Dean of Students for punishment. However, I'd much rather have you be too proud to cheat than too scared to cheat.

**Exams**: Exams will take place outside of class time. You will get more information later.

**Disability Accommodations**: I am always happy to discuss any disability-related needs. Please talk to me after class or send me an email. For test-taking, note taking and other accommodations and resources, contact the Center for Accessible Education (CAE) at (310) 825-1501 or in person at Murphy Hall A255. When possible, you should contact the CAE within the first two weeks of the term, as reasonable notice is needed to coordinate accommodations. For more information, visit [www.cae.ucla.edu](http://www.cae.ucla.edu).