BIMM 140 Syllabus
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Section 1

Overall questions that will be pursued in Section 1 of the course:

- *What is randomness in biology?*
- *How does randomness arise?*
- *How is randomness measured in biological systems?*
- *What is the biological role and function of randomness?*

Section 1: This section serves to introduce the concept of stochasticity in biology, which is an advanced topic that is typically not covered sufficiently in standard biology textbooks. This section will also provide a conceptual framework for section 2 of the overall course.

In this section 1, students will be introduced to the concept of randomness in biology and also how randomness can arise both in space and time. The overall goal is to provide a more realistic and deeper understanding of actual molecular and biological processes that take place within the cell. Specifically, we will start with randomness at the single molecule level and then expand all the way to the population level. We will refer to a few select research papers that represent landmark studies on this topic.
At the conclusion of this section, we will have discussed fundamental questions such as: What is randomness in biology? How does randomness arise in a biological system? How can we measure randomness as a function of time and space? What is the functional role of randomness in biology? And why it is absolutely necessary to be quantitative in order to understand biological processes that are based on randomness.

Lect 1	Introduction to course and concept of stochasticity (a.k.a. noise/randomness)
Lect 2	What is the source of randomness? Single molecule events - enzymes
Lect 3	What is the source of randomness? Single molecule events – enzymes
Lect 4	Randomness in the brain – noisy ion channels
Lect 5	Can gene expression be random? The “noisy” central dogma of biology
Lect 6	Can gene expression be random? The “noisy” central dogma of biology
Lect 7	Randomness in cellular differentiation – bacteria
Lect 8	Randomness in cellular differentiation – bacteria and beyond
Lect 9	Randomness in development – The compound eye of fruit flies
Lect 10	Can cells control/suppress noise – organization and timing.
Lect 11	How does the brain cope with noisy channels?
Lect 12	How can multicellular development be accurate despite noise?
Lect 13	Review for the midterm
Lect 14	Midterm (Monday, November 2)

Canvas

Everything for this section of the course will be presented on Canvas. Ensure you set up your notifications correctly. Students are responsible for any information sent out through Canvas announcements, regardless of their notification settings.

Zoom

All lectures will be presented remotely using Zoom. You must first login to Canvas and then you can access the meeting link in the Canvas calendar. The Zoom link and password should never be shared in any form of communication or be posted publicly. All lectures will be recorded and available in the media gallery of Canvas.

You must sign into the Zoom meeting using your UCSD account. Even if you are signed into Canvas with your UCSD credentials, you also must be signed into Zoom with your UCSD credentials. If you have trouble logging into the meeting, do the following: 1) Sign out of Zoom completely. 2) Navigate to ucsd.zoom.us. 3) Sign in using Single Sign On. 4) Then sign into Canvas, click on the calendar, and then enter the meeting via the link.

Slides

Slides shown during class will be provided in pdf format (to reduce file size) after the lecture.
Please note that slides will NOT contain all the information, as additional information will be provided during the lectures, either verbally or on a white board.

Office Hour

Prof. Süel's office hour is scheduled on Wednesdays from 12:15-1:15. You can access the Zoom link in the Canvas calendar.

Grades

Each section of this course is worth 50 points for a total of 100 points. The points breakdown for this section is as follows:
3 Quizzes: 3 x 8 points = 24 points
1 Midterm: 26 points

Quizzes

There will be three quiz assignments for this section. These assignments are to be completed outside of lecture time. They will be available at noon on the following Fridays: October 9, October 16, and October 23. They each have to be completed by the following Monday at 11 a.m. Once you begin each assignment, you will have 45 minutes to finish it. Please contact me if you need a time accommodation.

Midterm

The midterm will be assigned at 11 a.m. on Monday, November 2. You may take it asynchronously up until 11 a.m. on Tuesday, November 3. Once you begin the exam, you will have 50 minutes to complete it. The IAs and I will be available over Zoom during our normal class time to answer questions. If you don't have questions, you do not have to login to the meeting. There will be no lecture on this day.