PHYS-466 Topics in biophysics and physical biology

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Course: Tuesdays, 10:15-12
Exercises: Thursdays, 14:15-15

Summary
This course provides exposure to research in biophysics and physical biology, with emphasis on the nature of scientific breakthroughs, and using critical reading of scientific literature. Each week, we will discuss the research of one recipient of the Max Delbruck Prize in Biological Physics.

Content
What constitutes a scientific breakthrough? An outstanding contribution to a scientific field? We will examine these questions by delving into the research of several recipients of the Max Delbruck Prize in Biological Physics, awarded bi-annually/annually by the American Physical Society. Course materials include video lectures by the prize recipients, as well as scientific literature. Students will have the opportunity to analyze, synthesize, and present synopses of papers they select in Biological Physics.

Learning Outcomes
By the end of the course, the student must be able to:
- Discuss
- Reason
- Argue
- Present
- Synthesize
- Analyze

Transversal skills
- Access and evaluate appropriate sources of information.
- Make an oral presentation.
- Summarize an article or a technical report.
- Write a scientific essay which synthesizes several sources of information.

Assessment methods
Continuous assessment includes oral and written contributions from students.

PHYS-466 Course Requirements

In-course participation: Worksheets, discussions. **10 pts**

Oral presentation: Choose one paper from the list, authored by a Delbruck Prize awardee, and present your analysis of it using the tools developed during the course. **20 pts**

Written essay: Choose one paper from the list, authored by a Delbruck Prize awardee, and present your analysis of it using the tools developed during the course. **20 pts**

The oral presentation and the written essay must be on different awardees, but within the same topical group (identified on the “awardees” lists). Each paper may only be selected by one student in the course.

Total **50 pts**

PHYS-466 Course Calendar

Date	Day (week)	Topic	To do
18.2	Tue (1)	Introductions / syllabus review	Review course content, ask questions
20.2	Thu (GT)	Structure of a scientific paper, critical reading	Look over worksheet, ask questions
25.2	Tue (2)	Introductory unit: Structure	Read PBoC 1.1, 1.2, 8.1, 8.4
27.2	Thu (GT)	Open discussion, Q&A	Ask questions
4.3	Tue (3)	George Feher, Roderick Clayton	Read paper
6.3	Thu (WS)	Discuss paper analysis	Bring completed worksheet
11.3	Tue (4, WS)	Peter Wolynes	Read paper
13.3	Thu (WS)	Discuss paper analysis	Bring completed worksheet
18.3	Tue (5)	Jose Onuchic, Ken Dill Discussion, outlook: Structure	Read paper
20.3	Thu (WS)	Discuss paper analysis	Bring completed worksheet
25.3	Tue (6, GT)	Introductory unit: Single molecule mechanics	Read PBoC 8.3
27.3	Thu (GT)	Open discussion, Q&A	Ask questions
1.4	Tue (7)	Paul Hansma	Read paper
3.4	Thu (GT)	Discuss paper analysis	Bring completed worksheet
8.4	Tue (8)	Carlos Bustamante	Read paper
10.4	Thu (GT)	Discuss paper analysis	Bring completed worksheet
15.4	Tue (9)	Steven Block Discussion, outlook: Single molecule mechanics	Read paper
17.4	Thu (GT)	Discuss paper analysis	Bring completed worksheet
29.4	Tue (10)	Introductory unit: Collective/emergent properties	Read pdf
1.5	Thu (WS)	Open discussion, Q&A	Bring completed worksheet
6.5	Tue (11)	William Bialek	Read paper
8.5	Thu (WS)	Discuss paper analysis	Bring completed worksheet
13.5	Tue (12)	Irene Giardina, Andrea Cavagna Discussion, outlook: Collective	Read paper
15.5	Thu	Discuss paper analysis	Bring completed worksheet
20.5	Tue (13)	Student presentations	Present, ask questions
22.5	Th	Student presentations	Present, ask questions
27.5	Tue (14)	Student presentations	Present, ask questions

These dates are subject to change at the discretion of the instructor.