

Class Schedule

Date	Topic	Presenter	Papers
Mon. 1/22	Intro to the course, genome sequencing & how to read a paper	-	-
Wed. 1/24	How to give a paper presentation & repetitive elements	Shakson	Fuentes et al., 2018 (Shakson)
Mon. 1/29	Genome analysis	Jakob; Chris	Li et al., 2023 (Jakob) Christmas et al., 2023 (Chris)
Wed. 1/31	Comparative genomics & metagenomics	Vy; Laila	Rodriguez Del Rio et al., 2023 (Vy) Kirilenko et al., 2023 (Laila)
Mon. 2/5	Transcriptional regulation I	Alex; Rohit	Vierstra et al., 2020 (Alex) Sahu et al., 2022 (Rohit)
Wed. 2/7	Transcriptional regulation II	Amir; Jessika	Fulco et al., 2019 (Amir) Osterwalder et al., 2018 (Jessika)
Mon. 2/12	Transcriptomics I	Patrick	Subramanian et al., 2017 (Patrick) Ye et al., 2018 (No presenter)
Wed. 2/14	scRNA-seq	Jakob; Chris	Nitzan et al., 2019 (Jakob) Weinreb et al., 2020 (Chris)
Mon. 2/19	NO CLASS		

Wed. 2/21	Spatial transcriptomics	Vy; Laila	Russell et al., 2023 (Vy) Weinstein et al., 2019 (Laila)
Mon. 2/26	RNA stability & translation regulation	Alex; Rohit	Darnell et al., 2018 (Alex) Van Nostrand et al., 2020 (Rohit)
Wed. 2/28	Epigenomes, epitranscriptomes	Amir; Jessika	Tan et al., 2017 (Amir) Shen et al., 2018 (Jessika)
Mon. 3/4	Protein structure in genomics	Patrick	Jumper et al., 2021 (Patrick) Cao et al., 2022
Wed. 3/6	RNA shape & noncoding RNAs	Amir; Chris	Sarropoulos et al., 2019 (Amir) Corley et al., 2020 (Chris)
Mon. 3/11	Spring Recess		
Wed. 3/13	Spring Recess		
Mon. 3/18	Genetic variation I	Vy; Laila	Backman et al., 2021 (Vy) Yengo et al., 2022 (Laila)
Wed. 3/20	Genetic variation II	Alex	Poon et al., 2021 (Alex) Alexandrov et al., 2013
Mon. 3/25	Genetic variation III	Jakob; Jessika	Reis et al., 2023 (Jakob) Kaplanis et al., 2020

			(Jessika)
Wed. 3/27	Imaging	Patrick; Rohit	Allen et al., 2023 (Patrick) Liu et al., 2021 (Rohit)
Mon. 4/1	Proteomics	Jakob; Chris	Thul et al., 2017 (Jakob) Satpathy et al., 2015 (Chris)
Wed. 4/3	Protein interactions, modifications, signaling	Vy	Garzon et al., 2016 Kastritis et al., 2017 (Vy)
Mon. 4/8	NHGRI Trainees Meeting (NO CLASS)		
Wed. 4/10	Metabolomics	No presenters (discussion only)	Ma et al., 2015 Yilmaz and Wahout et al., 2016
Mon. 4/15	Signaling dynamics	Alex; Rohit	Li et al., 2018 (Alex) Christodoulou et al., 2018 (Rohit)
Wed. 4/17	Chemical genomics & drug discovery	Amir; Jessika	Gordon et al., 2020 (Jessika) Stein et al., 2020 (Amir)
Mon. 4/22	Phenomics	Patrick; Laila	Barrio-Hernandez et al., 2023 (Patrick) Plata et al., 2015 (Laila)
Wed. 4/24	Final proposal presentations	Jakob, Chris, Vy	-
Mon. 4/29	Final proposal presentations	Laila, Alex, Rohit	-
Wed. 5/1	Final proposal presentations	Amir, Jessika, Patrick	-

Class led by Martha

Class led by Shamil

Class led by Chris

Class led by Peter

Class led by Marc

Course goals:

This course will provide a survey of 'omics, including genome sequencing, sequence analysis, transcriptomics, epigenomics, transcriptional regulation, post-transcriptional regulation, proteomics, protein signaling, chemical genomics, metabolomics, regulatory networks, phenomics and genetic variation analysis, primarily through discussion of primary research articles. Review articles and primer readings will be provided for additional background. Students will gain skills in critical paper reading and discussion, 'chalk talk' presentations, proposal writing, and oral presentation of proposals.

Course format:

This is an upper-level critical paper reading and discussion course in the areas of experimental and computational functional genomics. Students will be responsible for ~chalk talk™ style presentations of assigned articles and leading class discussions of those articles, as well as active participation in discussion of all assigned papers. There will be written and oral presentations of final student proposals at the end of the term.

Typical enrollees:

Graduate students in a life sciences PhD program. Typical enrollees include 1st year students in the Bioinformatics & Integrative Genomics PhD program; other past students have come from a wide range of PhD programs (e.g., Biophysics, BBS, OEB, SSQB), and occasionally upper-level undergraduates.

When is course typically offered?

This course is taught only in the Spring term.

What can students expect from you as an instructor?

This course is team taught by multiple faculty members. Every class will begin with a short overview of that day's discussion paper(s) in which the instructor will describe why each paper was chosen and the rationale behind its inclusion in the course, followed by student chalk-talk presentation of the paper(s) and discussion of the paper(s). A few weeks prior to submission of the final proposal, students will be required to submit a 1-page outline of their planned proposal; faculty will provide written feedback on the proposal outline to help guide the students in preparing their full written proposal.

Assignments and grading:

Students will be responsible for ~chalk talk™ style presentations of assigned articles and leading class discussions of those articles, as well as active participation in discussion of all assigned papers. Students will be required to post by 9 AM on Canvas a discussion question for each paper to be discussed in class that afternoon. There will be written and oral presentations of final student proposals at the end of the term. Proposals must implement functional genomics experimental approaches and/or analyze functional genomics data. This is an opportunity for students to creatively apply what they learn throughout the semester and to explore a topic of interest that is outside their current research area.

Grading:

30% class participation and preparedness

30% assigned paper presentations

30% end-of-term research proposal (15% written proposal, 15% oral presentation)

10% discussion questions posted to Canvas

Enrollment cap, selection process, notification:

Permission of the instructors is required. Enrollment will be limited to 20 students

This year's syllabus:

[Biophysics 205 - syllabus - Spring 2024](#)

[BP205 Intro Handout 2024.docx](#)

Past syllabus:

[Biophysics 205 - syllabus - Spring 2023 - Canvas.pdf](#)

Absence and late work policies:

Attendance is expected at each class meeting. Exceptions for late or rescheduled work will be made only in cases of illness or other extenuating circumstances.