January 15, 2017

CMPBIO 293 Doctoral Seminar in Computational Biology
Instructor: Lisa F. Barcellos, PhD, MPH (Fall) Nir Yosef, PhD (Spring)
Offered: Fall and Spring semester
Units: 2.0 (Letter Grade)
Course Format: Seminar
Course Number (spring): 32885

Course Description: This one-year interactive seminar builds skills, knowledge and community in computational biology for first year PhD and second year Designated Emphasis students, but open to anyone with an interest in computational biology. Topics covered this semester include methods in computational genomics, focusing on single-cell RNA-sequencing and functional prediction of regulatory genomic regions. In addition, we will cover laboratory methodologies (e.g., Next generation sequencing), general computational tools (e.g., data visualization), critical review of current research studies in the field, and developing important skills for success in the PhD such as learning how to better present your research. Faculty members in related fields from UC Berkeley and other institutions will participate.

SPRING 2017 SYLLABUS:

Week	Date	Subject	Instructor(s)
1	1/18	**Introduction** Class introduction Discussion: how to give a good talk	N. Yosef/S. Afik
2	1/25	**Next generation sequencing** How does the DNA sequencer work Sequencing output: format and basic QC	J. Choi S. Afik
3	2/1	**Read Alignment 1** Exact string matching, handling mismatches and gaps *Homework #1 due on 2/22*	N. Yosef
4	2/8	**Read Alignment 2:** RNA alignment **Journal Club #1:** Dude, where are my reads?	S. Afik Students

5	2/15	**No class / comp bio recruitment events**	
6	2/22	**Spotlight on single cells:** Dr. Aaron Streets **Journal club #2**: Human cell atlas and other future perspective *Homework #1 due*	A. Streets Students
7	3/1	**Group presentations: Single cells** Technical variation in single cell sequencing Single cells in cancer research	Students
8	3/8	**Visualization using 2-dimensional maps** PCA and tSNE Visualization lab exercise with R notebook *Homework #2 due on 3/29*	N. Yosef S. Afik
9	3/15	**BYOR - bring your own research**	Students
10	3/22	**BYOR - bring your own research**	Students
11	3/29	**No class / Spring break** *Homework #2 due*	
12	4/5	**Transcription dynamics:** Dr. Herman Garcia **Journal club #3:** Synthetic biology as tomorrow's test tubes	H. Garcia Students
13	4/12	**Transcription dynamics and logic:** Dr. Nadav Ahituv **Journal club #4:** Massively parallel decoding of mammalian regulatory sequences	N. Ahituv Students
14	4/19	**Prediction methods** Basic concepts of classification Classification lab exercise with R notebook *Homework #3 due on 5/10*	N. Yosef S. Afik
15	4/26	**Group presentations:** classification methods for annotating the non-coding genome **Wrap up and course evaluations**	Students

Grading:
- Attendance & participation   30%
- Assignments and presentations   70%

Instructor Contact Information:
Professor: Nir Yosef
Office Location: 304A Stanley Hall
Office hours: Tuesday, 9:00-10:00
email: niryosef@berkeley.edu

Graduate Student Instructor: Shaked Afik
Office Location: 378 Stanley Hall
Office hours: Tuesday, 11:00-12:00
email: safik@berkeley.edu

Location: 321 Stanley Hall, Wednesdays 12:00-2:00 p.m. Students are encouraged to bring their lunch to class!

Attendance: Attendance (sign-in) is taken each week. If you are going to miss a class you are encouraged to contact the instructors ahead of time. Attendance each week of the semester is critical to success in the course. **If you miss more than two classes, you will be dropped from the course.**

Lecture Slides and Course Reading Assignments: Slides will be posted on bCourses after each class. Most (but not all) reading assignments will be posted on bCourses, see link for full list. Don't get behind on reading! Reading is required ahead of the assigned class. Reading list for each class might be changed up to one week prior to class, so be sure to check the link for updates.

Presentation: Each student is required to give two presentation during the semester. Further guidelines and instructions on how to schedule the presentations are found on bCourses.

Journal club: Journal club papers, along with instructions and questions in preparation for the journal club will be posted on bCourses at least one week prior to each journal club.

Homework Assignments: These will be posted on bCourses and are due before class begins on dates listed in syllabus. Assignments should be submitted as pdf or word

document through bCourses. Last name must be included in file name. In addition, first and last name should be included at the top of the document.

Laptop **Policy**: Laptops are only allowed for designated work/lab periods and journal club sessions; otherwise do not plan on using them. Phones are not permitted. This is a strict policy.

Mental **Health**: If you are experiencing stress, anxiety, or other forms of distress during the semester, we hope to be a resource for you. Please reach out to the GSI or Professor if you need support. There are also many resources available to you. All registered Berkeley students are eligible to use Counseling Psychological Services. You do not have to purchase the Student Health Insurance Plan to use these services. The first five counseling sessions are free for registered Berkeley students. Counselors can provide support in academic success, life management, career and life planning, and personal growth and development.

UC Berkeley, Counseling Psychological Services:
- Please call (510) 642-9494 or stop by the office on the 3rd floor of the Tang Center to make an appointment with a counselor.
- Drop-in counseling for emergencies: Monday - Friday, 10:00AM - 5:00PM
- After hours counseling: In the case of emergencies at night or on weekends, call (855) 817-5667 for free assistance and referrals. Request to speak with a counselor.
- For emergency support: Call UCPD by dialing 911 from a landline anywhere on campus or call (510) 642-3333 from any phone.

24 Hour Crisis Hotlines:
- Alameda County Crisis Line: (offers confidentiality, TDD services for deaf and hearing impaired callers and translation in 140 languages) Call 1-800-309-2131
- National Crisis Help Line: Call 1-800-273-TALK
- National HopeLine Network: Call 1-800-SUICIDE
- Crisis Text Line: Text START to 741741

We also ask that you look out for your fellow peers. If you see any of the signs below that may indicate your classmate may need assistance, please use the resources above or reach out to the GSI or Professor.
- Withdrawing from other people
- Changes in weight or eating patterns
- Changes in sleeping patterns

- Fatigue or lack of energy
- Increased anxiety or irritability
- Feeling worthless or hopeless

Academic Dishonesty:

Academic dishonesty is not acceptable at UC Berkeley. Academic dishonesty is any action that may result in creating an unfair academic advantage for oneself or unfair academic disadvantage for another member of the academic community. Therefore, any exam, quiz, paper, and/or homework assignment submitted by you for any class that bears your name should be your own original work. In all of your assignments, including your homework or drafts of papers, you may use words or ideas written by other individuals in publications, web sites, or other sources, but only with proper attribution. 'Proper attribution' means that you have fully identified the original source and extent of your use of the words or ideas of others that you reproduce in your work for this course, usually in the form of a footnote, parentheses or quotations. If you are not clear about the expectations for completing an assignment, be sure to seek clarification from the instructor or GSI beforehand. Cheating and plagiarism are forms of academic dishonesty and are NOT TOLERATED under any circumstance. Any evidence of academic dishonesty will result in a score of zero (0) on that assignment or exam, and will be reported as soon as possible to the Center for Student Conduct (http://sa.berkeley.edu/conduct). This will result in a permanent scar on your academic record. In 2015, UC Berkeley launched the Turnitin service (https://www.ets.berkeley.edu/discover-services/academic-integrity/turnitin-students-getting started) to support academic integrity and the campus honor code. Turnitin is an opt-in tool enabled through bCourses that allows Instructors and GSIs to check student assignments for originality. We will use Turnitin in this course for all written assignments. The consequences of cheating and academic dishonesty are substantial, including a formal discipline file, possible loss of future internship, scholarship, or employment opportunities, and denial of admission to graduate or medical school.