

SYLLABUS

QBIO 105: Introduction to Quantitative Biology Seminar

This course is a required course for students majoring in Quantitative Biology and can only be taken by QBIO students.

Spring 2021

- Time and Location:** Tuesdays, 3:30-5:10 pm **ONLINE**
- Course Instructors:** Dr. Peter Calabrese (petercal@usc.edu)
Assistant Professor (Teaching) of Quantitative and Computational Biology, Director of Undergraduate Studies – QBIO Major
- Dr. Remo Rohs (rohs@usc.edu)
Professor of Quantitative and Computational Biology, Chemistry, Physics & Astronomy, and Computer Science
- Teaching Assistant:** Anna Nadtochiy (nadtochi@usc.edu)
Graduate Student in Computational Biology and Bioinformatics

Introduction (from the USC catalogue):

This course is the introductory seminar for students taking the QBIO major. It is ideally taken as freshman but it can be taken after a student's transfer into the QBIO program. The instructors will introduce the general field of Quantitative Biology, its definition and role within the Biological Sciences, and its relationship with Chemistry, Computer Science, Engineering, Mathematics, Medicine, and Physics. The curriculum will include introductory lectures by the instructors, guest lectures, discussions, and student presentations.

Schedule:

- 1/19 Dr. Karla Heidelberg**
Program Director, Organisms and Ecosystems, Polar Education
National Science Foundation
The history of environmental genomics
- 1/26 Dr. Raluca Gordan**
Associate Professor of Biostatistics & Bioinformatics and Computer Science
Duke University
Deciphering the regulatory information encoded in our genomes
- 2/2 Dr. Evan Eichler**
Professor of Genome Sciences
University of Washington
Human evolution by segmental duplication
- 2/9 Dr. Julia Zeitlinger**
Investigator
Stowers Institute for Medical Research
Out of the black box: a high-resolution genomics view on how genes are regulated

- 2/16 Dr. Simon Tavaré**
Professor of Biological Sciences and Statistics, Director of Institute for Cancer Dynamics
Columbia University
Cancer by the numbers
- 2/23 Dr. Aaron Smargon**
Postdoctoral Scholar
University of California San Diego and Sanford Consortium for Regenerative Medicine
Programming RNA with CRISPR and beyond
- 3/2 Dr. Anshul Kundaje**
Assistant Professor of Genetics and Computer Science
Stanford University
Interpreting machine learning models of gene regulatory profiling experiments to decode functional DNA sequence and genetic variation
- 3/9 Dr. Ke Gong** (Graduate of QCB Department)
Data Science Manager
Facebook
Data scientist at Facebook
- 3/16 Dr. Ben Decato** (Graduate of QCB Department)
Senior Scientist, Translational Bioinformatics
Bristol Myers Squibb
My experience navigating the biopharma industry as an early career bioinformatician
- 3/23 Wellness Day – No class**
- 3/30 Dr. Stephan Preibisch**
Team Leader
Janelia Research Campus, Howard Hughes Medical Institute
Pushing the boundaries of microscopy to study biology in the context of entire organ(ism)s
- 4/6 Dr. Helen Berman**
Board of Governors Distinguished Professor Emerita of Chemistry and Chemical Biology
Rutgers University
Building community resources for structural biology
- 4/13 Dr. Tianyin Zhou** (Graduate of QCB Department)
Engineering Manager
Google
Machine learning models powering Google shopping ads
- 4/20 Dr. Lior Pachter**
Bren Professor of Computational Biology
California Institute of Technology
How to count to zero: methods for single-cell RNA-seq
- 4/27 Dr. Richard Mann**
Higgins Professor of Biochemistry and Molecular Biophysics, and Systems Biology
Columbia University
Intersecting genomics and genetics to understand animal development

Additional recorded lecture:

Dr. Ada Yonath

The Martin S. and Helen Kimmel Professor of Structural Biology

Nobel Laureate in Chemistry

Weizmann Institute of Science, Israel

Next generation antibiotics

Weekly Reports (10 points each; 140 points total): Reports should be no more than one page in length with up to 500 words. Reports must be typed and submitted electronically to the TA. Late reports will receive a maximum of 5 points. There will be a total of 14 weekly reports. These reports will have two parts: (a) summary of the previous lecture, and (b) potential questions for this week's lecture. For part (a), you must state the name of the previous lecturer, the date and title of the lecture, and list the main points raised during the lecture and discuss the meaning of each. For part (b), you should research the current week's lecturer and topic and pose several potential questions.

Grading: Your final letter grade in this course will be based upon all of your written reports, participation and discussion. Since there are no exams in this course, active participation and attendance are important components. The grade will consist of 140 points for weekly reports. Participation and active discussion will be considered for the final grade.

Statement for Observance of Religious Holidays: USC's policy grants students excused absences from class to observe religious holidays: <http://ori.usc.edu/life/calendar/absences/> In this case, please contact your instructor in advance to agree on alternative course requirements.

Statement for Students with Disabilities: Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Statement on Academic Integrity: USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *Scampus*, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.