G4120: Introduction to Computational & Quantitative Biology
Columbia University
Department of Microbiology & Immunology
Spring 2017

Director:	Oliver S. Jovanovic, Ph.D.	**Location:**	HHSC 1307
Phone:	(212) 305-3647	**Day & Time:**	Monday, 12:00 -1:30 P.M.
Email:	oj2@columbia.edu	**Credits:**	1

Description: This course will introduce graduate students to the concepts and methodology of bioinformatics, computational biology, next-generation sequencing analysis, systems biology, advanced imaging and biostatistics. It will introduce the databases, web sites, software, hardware, algorithms and programming languages currently used to analyze and quantify biological data and explain how these tools are best used.

Instructor: Oliver Jovanovic, Course Director, Microbiology & Immunology (oj2@columbia.edu).

Prerequisites: Previous or current graduate-level coursework in molecular biology and genetics, basic computer literacy. A laptop computer is required for the course, and should be brought to every session.

Texts: No required textbooks. Recommended texts include *Practical Computing for Biologists* by Stephen Haddock & Casey Dunn, *BLAST* by Ian Korf, Mark Yandell & Joseph Bedell and *Introductory Statistics with R* by Peter Dalgaard.

Website: Additional course information and course files will be made available at http://www.microbiology.columbia.edu/icqb

Attendance: Students are expected to attend all sessions of the course. In the event of an absence due to illness or an emergency, students are responsible for making up for the material covered in that session.

Assignments: Practical take-home work will be assigned throughout the course.

Grading: Pass/Fail. All assignments must be completed to receive a passing grade.

Notes: Most sessions will consist of a lecture portion, followed by hands-on computer practice with a laptop. Involved questions should be saved for the end of each session, as the course will move quickly, but do not hesitate to ask questions in class if something is unclear or requires additional explanation.

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January 23rd, 12:00-1:30 P.M.	Introduction and Organization
January 30th, 12:00-1:30 P.M.	Introduction to Bioinformatics
February 6th, 12:00-1:30 P.M.	Introduction to Computing
February 13th, 12:00-1:30 P.M.	Introduction to Bioinformatics Resources and Databases
February 20th	*No class – President's Day*
February 27th, 12:00-1:30 P.M.	Unix and Scripting
March 6th, 12:00-1:30 P.M.	Sequence Analysis
March 13th	*No class – Spring Break*
March 20th, 12:00-1:30 P.M.	Genomics
March 27th, 12:00-1:30 P.M.	Introduction to Programming
April 3rd, 12:00-1:30 P.M.	Introduction to Python and Biopython
April 10th, 12:00-1:30 P.M.	Quantitative Analysis and Presentation of Visual Data
April 17th, 12:00-1:30 P.M.	Introduction to Statistics
April 24th, 12:00-1:30 P.M.	Data Visualization with R and RStudio