

QBrEC Lab – EL24B

Jane Kondev, Physics Department, Abelson 301, Office hours: Tuesday 5-6PM or by appt.

Course Description. In this course, you will quantitatively explore the living world by doing experiments in research labs at Brandeis. The emphasis is on interdisciplinary science where techniques and ideas from physics, chemistry and biology are used to develop a quantitative understanding of life at the molecular level.

Course Plan: The lab component will consist of two six week-long research projects. One hour-long lecture will take place every week. Additionally, you will spend three to four hours every week in a research lab performing experiments or doing computational work. Lecture and lab reflection will be Mondays 5-6:20PM.

Lectures are all by QBrEC faculty and invited speakers from area universities. The goal of the lectures is to inform students about cutting edge research at the interface of the physical and life sciences and to introduce some of the key ideas and techniques employed in the QBrEC labs.

Lab reflections will be an instructor moderated discussion of various aspects of lab work. The goal will be discovering common experiences shared by labs doing research in different subject areas, as well as establishing a common language (using concepts from math, physics, chemistry, and biology).

Each lab project will be researched by student pairs alongside a senior graduate student who will serve as the QBrEC instructor. The projects are structured in such a way that each student will make, measure and model something in the lab under the tutelage of the QBrEC instructor. Every student will present their findings in a poster session and a five-page report to the instructor at the end of each project.

Research lab topics:

<u>QBrEC Instructor</u>	<u>Lab</u>	<u>Project</u>
Lina Ni	Garrity (Biology)	Investigation of the crosstalk between temperature and humidity sensation in fruit flies
Madelene Diaz	Rosbash (Biology)	Neuropeptides in clock circuit of <i>Drosophila</i>
Gabe Bronk	Kondev (Physics)	Computational modeling of DNA repair processes
Adrew Balchunas	Dogic (Physics)	Investigating Polymorphic Phase Transitions of Bacterial Flagella and Stretching Microscopic Springs
David Harbage	Kondev (Physics)	Simulating self-assembling filament length control

Eric James	Marder (Biology)	Probing the role of sodium-potassium pumps in intermediate mechanisms of compensation
Joe Rauch	Kondev (Physics)	Modeling the microbial world
Tim Wiggins	Griffith (Biology)	Analysis and Modeling of Fly Activity Patterns

Lecture Schedule:

<u>Week</u>	<u>Topic</u>
1 1/23	Course intro. Project presentations (QBRcC instructors)
2 1/30	Showing off your science (QBRcC instructors)
3 2/6	Prof. Bruce Goode
4 2/8	The art of a good Intro (QBRcC instructors)
5 2/13	Prof. Avital Rodal
6 2/27	A figure speaks a 1000 words (QBRcC Instructors)
7 3/6	Poster Session 1
8 3/13	Prof. Zvonimir Dogic
9 3/20	The End: Conclusion (QBRcC Instructors)
10 3/27	Prof. Andrew Murray (Harvard)
11 4/3	Prof. Michael Rosbash
12 4/19	Prof. Eve Marder
13 4/24	Prof. Mo Khalil (BU)
14 5/1	Poster session 2

Evaluation: Lab notebook (20%), Posters (25%), Reports (40%), Class/Lab participation (15%).
Success in this 2 credit-hour course is based on the expectation that students will spend a 1-2 hours of study time per week in preparation for class and lab sessions. The total time commitment for this course is 6-7 hours a week.

Disabilities. If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please see me immediately.