

## Syllabus QB 826, fall 2015

# QB 826, Introduction to Quantitative Biology Techniques

A 1-credit, intensive lab workshop before the start of fall 2015  
Monday to Friday, August 17–21, 9:00 AM to 5:00 PM, plus Tuesday  
and Thursday discussions, 6:00 to 8:00 pm

*The goal of this workshop is to combine professional development with various dimensions of interdisciplinary research, such as teamwork, cultural and vocabulary differences, as well as diversity in the learning and thinking process.*

**Instructors:** Claire Vieille      6172 BPS      884-5392      [vieille@cns.msu.edu](mailto:vieille@cns.msu.edu)  
Guest instructors

**Grading:**      Pass/Fail course

**Enrollment:** 12 maximum

In the computer lab section, students will be introduced to a variety of software that allow scientist to analyze biological data. This year, this will include learning basic commands in UNIX, learning basic coding syntax in python, aligning short sequence reads to a genome sequence, analyzing enzyme assay data to calculate kinetic constants, modeling a protein 3D structure, and modeling a metabolic network using enzyme kinetic constants.

On Tuesday evening, students will practice describing their research to students in the class in 10-min chalkboard presentations. On Thursday evening, students will participate in a discussion that integrates aspects of interdisciplinary research.

The main focus of this course is not so much to learn numerous techniques, but for students coming from different backgrounds (mathematics, physics, biology, computer science, statistics, chemistry, etc.) to learn to work together, learn how people with different educational backgrounds think, and to prepare to work in interdisciplinary environments.

## Schedule QB 826 August 17 – 21, 2015

All sessions will be in rooms 117, 202, and 208 in the Biochemistry building

- Mon** 9:00-9:30 Introduction to the course (Vieille, rm 208)  
9:30-12:00 *Comp lab*: Unix basics, PyMol molec visualization tool (Pappan, rm 202)  
2:00-5:00 *Comp lab*: Introduction to Python (Johnston, rm 202)
- Tue** 9:00-12:00 *Comp lab*: Homology modeling of protein structure (Pappan, rm 202)  
2:00-5:00 *Comp lab*: Aligning short sequence reads to a genome sequence (Johnston, rm 202)  
6:00-8:00 10-min student research presentations (Vieille, room 208)  
Pizza and drinks provided
- Wed** 9:00-10:30 *Lecture*: X-ray crystallography (Garavito, rm 208)  
10:30-12:00 *Comp lab*: Interpretation of electron density maps (Garavito, rm 202)  
2:00-5:00 *Comp lab*: Interpretation of electron density maps (Garavito, rm 202)
- Thu** 9:00-12:00 *Bio lab*: Enzyme kinetic assays (Vieille, rm 117)  
2:00-5:00 *Comp lab*: Curve fitting, calculating  $K_m$  for substrate and  $K_i$  for inhibitor.  
(Using results from morning experiments) (Vieille, rm 202)  
6:00-8:00 *Discussion*: benefits and difficulties associated with doing interdisciplinary research  
(Vieille, rm 208)  
Pizza and drinks provided
- Fri** 9:00-10:30 *Lecture*: Metabolic network modeling (Feig, rm 208)  
10:30-12:00 *Comp lab*: Metabolic network modeling (Feig, rm 202)  
2:00-5:00 *Comp lab*: Metabolic network modeling (Feig, rm 202)