

Bio 4342/434W: General Course Information (Spring 2016)

<u>Instructors</u>	<u>Office</u>	<u>Telephone</u>	<u>e-Mail</u>
Sarah C R Elgin	131 McDonnell Hall	935-5348	selgin@biology.wustl.edu
Elaine Mardis	The Genome Institute	286-1805	emardis@wustl.edu
Jeremy Buhler	Jolley Hall 530	935-6180	jbuhler@cse.wustl.edu
Chris Shaffer	McDonnell 112 (Danforth)	935-6837	shaffer@biology.wustl.edu

Teaching Assistants

Wilson Leung McDonnell 112 (Danforth) 935-6837 wleung@wustl.edu

Sequence improvement: Lee Trani WU Genome Institute

Annotation: Yu He (yu.he@wustl.edu)

 Daniel Cui Zhou (daniel.cui@wustl.edu)

Writing Instructor: April Bednarski (aprilb@wustl.edu)

Class Schedule

Lecture and lab will function together. The class will meet from 1:30 to 5:00 PM on Monday and Wednesday, and from 1:30 to 2:30 PM on Friday; occasionally the Friday session will extend to 3:30 or 4:30 (see schedule). Students who elect the writing-intensive option (Bio 434W) will have ca. 5 additional hour-long meetings to focus on writing, scheduled for Friday 2:30-3:30 PM. Attendance is required. Because this is a laboratory course, true make-up sessions are often not possible. Students who must miss a class due to ill health, a death in the family, or a med school/grad school interview should inform Dr. Elgin prior to the class session to obtain a bye. If you miss a class, you are responsible for obtaining notes and information from the instructor; consulting with the instructor and/or a TA as necessary to gain an understanding of the material covered; and catching up on your work as needed.

Meeting Sites

Class will meet in the Biology Department, Life Sciences 311, on the Danforth Campus. On Friday January 22 we will meet at the WU Genome Institute, Fourth Floor Lobby, 4444 Forest Park Parkway, for a tour. The Institute is ca. 2 blocks from the West End Metro stop (catch the 1:14 pm train at Skinker).

Texts

There are no required texts. The texts used in Bio 2960/2970 (or any molecular genetics course) will cover the basic biology knowledge needed. The following books in bioinformatics may be useful, depending on your background. These books will be on reserve in Olin Library.

“Bioinformatics and Functional Genomics” by R. Pevsner, 2015 (3rd ed.), J. Wiley & Sons, NJ, (ISBN: 978-0-470-08585-1; WU QH441.2 .P48). Recommended for Bio majors if you would like more introduction to the computer tools we use.

“BLAST” by I. Korf, M. Yandell, J. Bedell, 2003, O’Reilly (ISBN 0596002998) (recommended for in-depth use of BLAST and interpretation of results). Available on-line from Olin Library at <http://libproxy.wustl.edu/login?url=http://proquest.safaribooksonline.com/?uiCode=washumo&xmlId=0-596-00299-8>

Web Site

All course information, announcements, reading assignments, etc. will be posted on BlackBoard. Basic information and reading will also be posted on the Bio 4342 web site <http://www.nslc.wustl.edu/courses/Bio4342/bio4342.html> maintained by the Biology Department through the NSLC. The latter portion of the web site is password protected. This has copies of all of the recommended and required reading. Most of the teaching materials used in the course can be found at the Genomics Education Partnership web page (<http://gep.wustl.edu>) under Curriculum. Examples of student papers from previous years are also found on the GEP site.

Student Responsibilities, Grading

Grades will be assigned based on the following components: participation in discussions, four summary papers on reading, 12%; six graded computer-based problem sets, 18%; final report on finishing a ~100 kb *Drosophila* project (written 15% and oral 5%); report on genes/pseudogenes, (written 10% and oral 5%); TSS oral report 5%; final report on individual *Drosophila* fosmid (analysis and annotation) (written 25% and oral 5%). (Note homeworks and reading summaries are graded with a check = 8 pts, check plus = 10 pts, or check minus = 6 pt.) Students who elect the Writing Intensive version of the course will have an introductory writing assignment; quality of all critiques and revisions will constitute 5% of the final grade.

Lab Overview: Sequencing / Finishing

During the first 2½ weeks of the semester, we will be engaged in sequence improvement and genome assembly, covering the following:

- Direct sequencing techniques for DNA—both manual and automated (videos);
- Use of Phred/Phrap/Consed to assemble and evaluate sequence reads;
- Finishing process—scanning for errors in mononucleotide runs, sorting reads, searching for additional project data in the original data set, calling sequencing primers from the genomic DNA template, adding additional data; methods for assessing quality of finished sequence.

Lab Overview: Analysis / Annotation

We anticipate that students will become familiar with commonly used DNA databases; model organism websites; genome browsers; RepeatMasker; Genscan and other gene prediction tools; BLAST, BLAT searches for similarity; Clustal for comparative analysis; techniques for annotating transcription start sites; techniques for motif searching. As time permits and the research dictates, we may explore other databases and comparative tools.

Computers

We will have large-screen Macs available for your work in class, and/or we can provide Mac laptops for your use during the course. If you check out a laptop, you will be responsible for returning it in good condition at the end of the semester. If you prefer, you can use your own portable computer. However, we recommend that only Macs be used during our work on sequence improvement (first 2½ weeks of the course), as Consed (the key software) is available only in a Mac version. (It can only be used on a PC in a virtual machine.) Either a Mac or a PC can be used when we are working on annotation (remaining weeks of the course). We will provide a portable hard-drive for the class, but you are responsible for backing up your work at the end of each session!