

## Biosc 2140 - Genomics

**Dates** 31 August 2015 – 7 December 2015

**Time** Monday, 1:00 – 2:50 pm

**Place** 214 Langley Hall

**Web** Courseweb

Instructor	Office	Email
James M. Pipas	559B Crawford Hall	<a href="mailto:pipas@pitt.edu">pipas@pitt.edu</a>
Graham F. Hatfull	376 Crawford Hall	<a href="mailto:gfh@pitt.edu">gfh@pitt.edu</a>

### Course purpose

Advances in molecular biology have enabled the collection of a great deal of sequence data. Genomic analyses seek to create knowledge from data, and understanding from knowledge. Genomic studies seek to understand the organization of, and information embedded within, entire genomes. Students will learn a variety of techniques in structural, functional, comparative and meta- genomics directed at using genome sequence data to address questions of interest.

### Class Schedule

Genomics meets once weekly for 110 minutes; classes will be a mixture of lectures and general discussion. The class meets on the following dates, and will span the topics as listed (but not necessarily on assigned date):

Lecture	Day	Date	Instructor	Topics will include:
1	Monday	31 Aug	Pipas/Hatfull	Genomes & Their Challenges
2	Monday	14 Sep	Pipas	Sequence determination and assembly
3	Monday	21 Sep	Pipas/Hatfull	Sequence Alignment
4	Monday	28 Sep	Pipas/Hatfull	Searches and Databases
5	Monday	5 Oct	Pipas/Hatfull	Functional Elements I
6	Monday	12 Oct	Pipas/Hatfull	Viral Genomics
7	Monday	26 Oct	Pipas/Hatfull	Profiling Gene Expression
8	Monday	2 Nov	Pipas/Hatfull	Global Manipulation of Gene Expression
9	Monday	9 Nov	Pipas/Hatfull	Proteomics
10	Monday	16 Nov	Pipas/Hatfull	Viral Metagenomics
11	Monday	23 Nov	Pipas/Hatfull	Still More Viral Metagenomics
12	Monday	30 Nov	Pipas/Hatfull	Phylogenetics
13	Monday	7 Dec	Pipas	Phylogenomics

### Software

Some classes may require out of class work using publically available software.

### Primary Literature.

Students will be asked to read papers form the primary literature. Papers should be read prior to the class in which they will be discussed. Copies of the papers (either electronic or printed) should be brought to class.

### What incoming students should know

Students should have a good general knowledge of genetics, gene expression and the genome structures of eukaryotes, prokaryotes and viruses. If these topics are less familiar, students should consult an undergraduate text in genetics and review its contents prior to the first class meeting. The following concepts should be familiar:

- Genomes, chromosomes, plasmids
- Centromeres, telomeres, chromatin, heterochromatin
- Genes, exons, introns, operons

- Promoters, enhancers, activators, repressors
- Replication, transcription, translation
- Mutation, substitution, recombination
- Alleles, dominant and recessive traits
- Homolog, ortholog, paralog

### **Grading Scheme**

Final grades will be calculated using two criteria. First, there will be up to 5 Genomics projects assigned during the course that will contribute a total of 50% towards the final grade. Each student must perform and submit her/his own work. Second, participation in classroom discussion is expected and will contribute 50% towards the final grade.

### **Academic Integrity**

Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity, noted below (\*\*), will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for a quiz, exam, or paper will be imposed.

\*\* The integrity of the academic process requires fair and impartial evaluation on the part of faculty and honest academic conduct on the part of students. To this end, students are expected to conduct themselves at a high level of responsibility in the fulfillment of the course of their study. It is the corresponding responsibility of faculty to make clear to students those standards by which students will be evaluated, and the resources permissible for use by students during the course of their study and evaluation. The educational process is perceived as a joint faculty-student enterprise which will perforce involve professional judgment by faculty and may involve—without penalty—reasoned exception by students to the data or views offered by faculty. Senate Committee on Tenure and Academic Freedom, February 1974

### **Email Communication**

Each student is issued a University email address ([username@pitt.edu](mailto:username@pitt.edu)) upon admittance. This email address may be used by the University for official communication with students. Students are expected to read email sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. The University provides an email forwarding service that allows students to read their email via other service providers. Students that choose to forward their email from their pitt.edu address 'to another address do so at their own risk. If email is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University email address. To forward email sent to your University account, go to <http://accounts.pitt.edu>, login to your account, click on Edit Forwarding Addresses, and follow the instructions on the page. Be sure to log out of your account when you have finished.