

**Syllabus**  
**Biochemistry/Molecular Genetics Group Studies 694**

*Instructors' names and contact details*

Venkat Gopalan (Course coordinator and Co-Instructor)  
Associate Professor, Department of Biochemistry  
707 Biological Sciences Building, 484 W 12<sup>th</sup> Ave  
Tel: 2-1332; Email: [gopalan.5@osu.edu](mailto:gopalan.5@osu.edu)  
Office hours: One hour/week; time to be decided after discussion with students

Amanda Simcox (Co-instructor)  
Professor, Department of Molecular Genetics  
972 Biological Sciences Building, 484 W 12<sup>th</sup> Ave  
Tel: 2-8857; Email: [simcox.1@osu.edu](mailto:simcox.1@osu.edu)  
Office hours: One hour/week; time to be decided after discussion with students

Dan Farrell (Guest lecturer)  
Professor, Department of Philosophy  
322 University Hall, 230 North Oval Mall  
Tel: 2-1534; Email: [farrell.4@osu.edu](mailto:farrell.4@osu.edu)

*Meeting days and times, and classroom location*

Saturdays 9.30-11.30AM, Learning Collaboration Studio, SEL. The course will be held *only* during five weeks of the Spring quarter.

*Course number and title*

Biochemistry/Molecular Genetics Group Studies 694  
Frontiers in life sciences research: An intellectual exchange between OSU students and their international peers.

*Expected learning outcomes*

- i. Students understand the basic facts, principles, theories and select methods pertaining to functional genomics and proteomics.
- ii. Students appreciate (through discussions of specific examples) the interdependence of fundamental scientific discoveries and technological developments.
- iii. Students explore at least some instances of (i) specific moral dilemmas that individual scientists face in their research, and (ii) general moral issues that both scientists and the public face in connection with scientific research and the possibilities it opens up to us.

*A description of the course*

This two-credit course will focus on genetics, genomics, proteomics and bioethics. The course will involve video-conferencing for two hours for each of the five weeks with students/faculty in a university in India.

As genomes are being sequenced at a rapid pace, it is vital for students in life sciences to stay abreast of the tools required to exploit genomic information. Drs. Amanda Simcox and Venkat Gopalan will describe the theoretical underpinnings of state of the art tools used in proteomics, genetics and genomics (six hours total). A subsequent two-hour lecture will be dedicated to student presentations from the different participating institutions. Students will describe the work of a Nobel laureate in Chemistry or Physiology that was featured in the course (<http://www.nobelprize.org> has a complete list of laureates). The presentation must include a description of the experimental work with emphasize on what was most innovative about the original findings and why this work was considered of such significant importance to be awarded a Nobel prize. To prepare the report, students are expected to read at least one of the original papers by the Nobel laureate and perform other literature searches, as necessary. This session is expected to be an inspiration for those considering a career in science.

The last two-hour session of the course will involve a provocative discussion with Dr. Dan Farrell, Professor of Philosophy, on the ethical issues that accompany remarkable advances in modern biology. Dr. Farrell will encourage students to explore (i) specific moral dilemmas that individual scientists face in their research and (ii) general moral issues that both scientists and the public face in connection with scientific research and the possibilities it opens up to us. It is expected that all of the students will find this dialogue an intellectually enriching experience as they will be exposed to perspectives from others around the globe whose viewpoints are molded by their local economy, culture, politics, geography, etc. The following topics will be covered in this new course.

Genetics and genomics (Simcox)

- Gene expression (Microarray analysis)
- Functional tests (RNAi, knockouts, etc.)
- Use of model systems to study biology and disease (flies, worms, etc.)

Proteomics (Gopalan)

- Mass spectrometry (ESI, MALDI-TOF, SILAC, ICAT, etc.)
- Proteome and protein-protein interaction network maps (yeast two-hybrid, affinity tagging, FRET, etc.)
- Structural and functional proteomics

Ethics (Farrell)

- Scientific integrity
- Genetic alteration of plants and animals (including stem cells)

*A list of required texts and other course materials, and information on where they are available*

There is no prescribed textbook for this course. All the relevant information will be from recent scientific literature. The instructors will post the handout materials for each session on Carmen.

*Information about the length and format of all papers, homework, laboratory assignments, and examinations*

Students will need to read at least two papers per week, and prepare and give a presentation with a group of other students. Students will write a blog on genomics and proteomics (blogger.com). At least weekly blog entries are required and should cover aspects the lectures, papers, news events and other thoughts related the course topics. All participants will have blogs and follow and sometimes comment on the blogs of their colleagues.

*Information about the scheduling of examinations and due dates for assignments*

There will be no formal examinations. However, students will be required to submit a term paper (about 5 pages) on a topic related to genomics and proteomics. (Due one week before the end of classes for OSU students.)

*Grading information, indicating the percentages assigned to various requirements*

A satisfactory (S) grade will be based on three criteria: (i) attendance, (ii) classroom participation, and (iii) a term paper. Missing a session will be cause for an unsatisfactory (U) grade.

*Grading scale*

S/U

*Class attendance policy*

Since there are only five sessions and all of them involve video-conferencing, no make-up sessions are possible. Absences will be allowed only for medical emergencies (written notice) or if the instructors have provided prior approval.

*Weekly topical outline of course meetings*

Weeks 1-3

Genetics and genomics (Simcox)

Proteomics (Gopalan)

Week 4

Student paper presentations and discussion

Week 5

Ethics (Farrell)

Scientific integrity

Genetic alteration of plants and animals (including stem cells)

*Statement on academic misconduct:*

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection

with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct ([http://studentaffairs.osu.edu/info\\_for\\_students/csc.asp](http://studentaffairs.osu.edu/info_for_students/csc.asp)).

*Statement about disability services:*

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu>.