

BIO C50H F2017

MACROEVOLUTION

Cindy Bongard
bongard@utsc.utoronto.ca

Lecture/Discussion group: Mondays 11:00 - 1:00 in BV363

Tutorial: Tuesdays 12:00 – 2:00 in BV 498

TA: Qusai Hassan [qusai.hassan@mail.utoronto.ca]

Office hours: (Room P104-110) Mondays 1:00-3:00 (or by appointment)

Course Content: Theoretical and practical aspects of the diversity of animal form and function, together with examination of the distribution patterns of representative taxa. Students will be exposed to the diversity of animal life and how this is organized for scientific study. The course consists of two parts: 1) a lecture-based section covering the evolutionary history of life on Earth and the evolutionary processes that result in macroevolution and 2) a computer based tutorial providing basic understanding of how to generate phylogenetic trees from DNA and proteins and how to use those trees to address macroevolutionary questions.

Prerequisite: BIO B50H and BIO B51

Evaluation:	Mid-term test (on lecture materials <u>up to test date</u>)	35%
	Tutorials	15%
	Tutorial tests	15%
	Final exam (on <u>all</u> lecture and select tutorial content)	35%

Assignments: The due dates are given in the Tutorial Schedule. Note that extensions are given *only* if a medical certificate is produced.
The penalty for work handed in late is *10%* of the maximum mark available for the assignment *per day*.

Course Text: *D.J. Futuyma. Evolution 4th Ed. 2017. Sinauer Associates*
(available from UTSC bookstore)

Make-up exams:

Students unable to attend a midterm or tutorial exam for religious reasons must notify the instructor by e-mail as soon as possible after announcement of the date of the exam, in order to make alternate arrangements. Students unable to make a midterm or tutorial exam due to sickness must contact the instructor by e-mail within 3 working days of the test, must present the instructor with a valid doctor's note and must complete a UTSC medical certificate (available via the registrar's website) which confirms their illness, and medical attention at the time of the exam.

Students who miss a final exam must petition to the registrar.

Lecture/Discussion Topics

<i>Lecture No.</i>	<i>Date</i>	<i>Planned Topic</i>
1	11 Sept	Course intro; classification: explaining diversity, phylogeny
2	18 Sept	Measuring diversity; driving forces
3	25 Sept	Spatial-temporal aspects of diversity
4	2 Oct	Geologic time – continental drift, influence of climate
	9 Oct	<i>Reading Week</i>
5	16 Oct	Diversification and evolution of animals
6	23 Oct	a) Species dispersal b) Biological realms
7	30 Oct	Mid-term test - [not confirmed TBA]
8	6 Nov	Biomes; tools and approaches in evolution
9	13 Nov	The life and death of species: essential concepts related to speciation, extinction and dispersal
10	20 Nov	Genes and chromosomes
11	27 Nov	Anthropogenic impact on species and systems
12	4 Dec	A look at the future

Tutorial Schedule (content may be subject to minor modification)

Tutorial	Date	New Phylogenetic Skill	Biological Topic
1	12-Sep-17	Genbank, genetic distances	Calibrating rates of molecular evolution
2	19-Sep-17	Parsimony	Horizontal gene transfer in bacteria and Arcaea
3	26-Sep-17	Bootstrapping	Plant evolutionary history
4	3-Oct-17	Parsimony on morphometric data	Are turtles Anapsids or Diapsids?
5	17-Oct-17	Maximum likelihood	Are birds dinosaurs or earlier tetrapods?
6	24-Oct-17	Tutorial Test	
7	31-Oct-17	Time calibrated trees and Parsimony based ancestor state reconstructions	When did the Great American Biotic Interchange in birds occur?
8	7-Nov-17	LTT plots, speciation and extinction rate estimates	Diversification rates in Neotropical birds
9	14-Nov-17	Maximum likelihood based ancestor state reconstruction	Evolution of swords in swordtail fish
10	21-Nov-17	Effect of character state on speciation and extinction rate estimates	Comparing rates of speciation and extinction in the Andes versus lowland
11	Nov 28	Tutorial Final	

ACCESSABILITY:

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the AccessAbility Services Office as soon as possible. We will work with you and AccessAbility Services to ensure you can achieve your learning goals in this course. Enquiries are confidential. The UTSC AccessAbility Services staff (located in SW302) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. Contact (416) 287-7560 or ability@utsc.utoronto.ca. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

ACADEMIC INTEGRITY STATEMENT:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (www.governingcouncil.utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences include, but are not limited to:

- **IN ASSIGNMENTS:** Using someone else's ideas or words without appropriate acknowledgement. Submitting your own work in more than one course. Making up sources or facts. Obtaining or providing unauthorized assistance on any assignment.
- **ON TESTS AND EXAMS:** Using or possessing unauthorized aids. Looking at someone else's answers during an exam or test. Misrepresenting your identity.
- **IN ACADEMIC WORK:** Falsifying institutional documents or grades. Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from me or from other institutional resources (see <http://www.utoronto.ca/academicintegrity/resourcesforstudents.html>).

Make-up exams: Students unable to attend a midterm or tutorial exam for religious reasons must notify the instructor by e-mail as soon as possible after announcement of the date of the exam, in order to make alternate arrangements. Students unable to make a midterm or tutorial exam due to sickness must contact the instructor by e-mail within 3 working days of the test, must present the instructor with a valid doctor's note and must complete a UTSC medical certificate (available via the registrar's website) which confirms their illness, and medical attention at the time of the exam.