

EEB504/EEB611: Fossil Fungi and Dating Phylogenetic Trees, 1 credit
The University of Tennessee, Spring 2018

Class time: W 11:15 am-12:05 pm, Hesler 427

Instructor: Dr. P. Brandon Matheny, Associate Professor (pmatheny@utk.edu)
Office hours: W 12:20-1:20, Hesler 334 (inside Hesler 332)
Or meetings by appointment

Course Description: This 1-credit course will introduce students to fossilized fungal samples, their diversity and means of preservation and interpretation, use in calibrating the fungal tree of life, and best practices for justifying fossil calibrations.

Course Textbook: Taylor TN, Krings M, Taylor EL. 2015. Fossil fungi. Academic Press, Amsterdam. 382 pp. The book is available as an e-book at UTK libraries where it can be viewed as a pdf full text file in your web browser or 'checked out' and viewed in Adobe Digital Editions 4.5. To do the latter, you'll need to download Adobe Digital Editions. Other readings will be posted on Canvas.

International Chronostratigraphic Chart: www.stratigraphy.org [go to Chart/Time Scale]

Course Learning Objectives:

- Be able to sketch a phylogeny of the 7 phyla of Fungi
- Recognize and describe eons, eras, periods, and epochs from the International Chronostratigraphic Chart
- Explain how fungal fossils are formed and studied
- Describe how old fungi are and the debate about their age
- Discuss the fossil record of chytrids
- Discuss the poor fossil record of Blastocladiomycota
- Describe the "zygomycete" fossil record
- Describe the fossil record of arbuscular-mycorrhizal (AM) fungi (the Glomeromycotina)
- Describe the fossil record of Ascomycota
- Describe the fossil record of Basidiomycota
- Explain the fossil evidence of lichens
- Describe the use of fossil spores in paleoecology and their classification
- Describe the fossil record of fungal interactions with animals, plants, and other fungi
- Be able to reconstruct an ultrametric tree (dated or not) in BEAST2

Course Assessment: Undergraduates enrolled in EEB504 will receive a satisfactory grade assuming they attend class, participate in discussion, and final project. Graduate students enrolled in EEB611 will receive a letter grade. EEB611 grades will be determined by class attendance, participation, and final project.

Important Dates:

19 Jan: Last day to final register, add, change grading options, or drop without a "W"
3 Apr: Last day to drop with a "W" (WP/WF)
27 Apr: Last day for university withdrawal

Course website: Go to "utk.instructure.com" to see the course website on Canvas. Any course materials will be posted here.

EEB504/611 Spring 2018 Course Schedule (note this is tentative and subject to change)

Session	Date	Topic
1	10 Jan	Overview of the fungal tree of life
2	17 Jan	Introduction and How Fungal Fossils Are Formed and Studied (Chpts. 1, 2) Reading: Spatafora et al. 2017. The fungal tree of life: from molecular systematics to genome-scale phylogenies
3	24 Jan	How Old Are the Fungi? (Chpt. 3) Additional Reading: Bengston et al. 2017. Fungus-like mycelial fossils in 2.4-billion-year-old vesicular basalt
4	31 Jan	Fossil Chytrids and fossil Blastocladiomycota (Chpts. 4, 5)
5	7 Feb	Fossil Zygomycetes (Chpt. 6)
6	14 Feb	Fossil Glomeromycota (Chpt. 7)
7	21 Feb	Fossil Ascomycota (Chpt. 8)
8	28 Feb	Fossil Basidiomycota (Chpt. 9) Additional Reading: Heads et al. 2017. The oldest fossil mushroom
9	7 Mar	Fossil Lichens and Spores (Chpts. 10, 11)
	14 Mar	No class – Spring Break
10	21 Mar	Fossil Fungal Interactions (Chpt. 12)
11	28 Mar	Best Practices for Justifying Fossil Calibrations Reading: Parham et al. 2012. Best practices for justifying fossil calibrations
12	4 Apr	Calibrating molecular estimates of substitution rates and divergence times Readings: Ho. 2007. Calibrating molecular estimates of substitution rates and divergence times in birds Graur and Martin. 2004. Reading the entrails of chickens: molecular timescales of evolution and the illusion of precision
13	11 Apr	Dating the molecular clock in fungi Reading: Berbee and Taylor. 2007. Dating the molecular clock in fungi – how close are we?
14	18 Apr	Introduction to BEAST2
15	25 Apr	Introduction to BEAST2
16	3 May	Presentation of dated phylogenies (10:15-12:15)

Academic integrity: Academic dishonesty of any sort will not be tolerated. Plagiarism includes the copying of phrases, portions of sentences or the main ideas from anyone (including a classmate) on any work submitted for a grade (exams, assignments, quizzes, etc). Academic dishonesty also includes assisting other students on quizzes or exams. You are expected to abide by The University of Tennessee honor statement in Biology and in all of your university activities as pledged in the honor code. Depending on the offence, penalties for academic dishonesty range from a minimum of a zero for the assignment, to an F for the course, to the filing of formal academic dishonesty charges seeking dismissal from The University of Tennessee. These choices are at the discretion of the instructor and can occur in either the lecture or the lab portion of the class.

You should be familiar with the requisites of academic honesty and what constitutes academic dishonesty as outlined in the UT Undergraduate Catalog (<http://catalog.utk.edu/>).

Other information

Disability Services: If you need course adaptations or accommodations because of a documented disability, please contact me privately to discuss your needs. If you have questions or concerns about disabilities or emergency information to share, please contact Disability Services: 2227 Dunford Hall; 974-6807; Email: ods@utk.edu; Website: <http://ods.utk.edu/>).

Counseling Center: <http://counselingcenter.utk.edu/>
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