Figure 1: On the species tree, the set \{Chimp, Human\} is a clade; on the gene tree (thin lines), \{H, G\} is a clade.

Grading will be based on homeworks assigned every 2–3 weeks and a final project, which will be either a small research project or recreating part of an analysis or simulation study from a research paper in the phylogenetic literature. There will be no final exam or tests.

An important component of the course will be using software to manipulate genetic data and to infer evolutionary trees, compute distances between evolutionary trees, display trees, etc. Software packages to be used include R, hybrid-Lambda, PAUP*, MrBayes, phylip, seq-gen, ms, and others. In addition, there will be an introduction to shell scripting in a Linux or MAC OS X environment so that you will learn to be able to conduct simulation studies that require running the same software hundreds or thousands of times in a loop. Previous knowledge of programming is helpful but not required. Homeworks will typically have a computational component.

Homework, 75%; Final project, 25%.

Late homework will be penalized 10% per day. Sliding homework under the office door is acceptable. If you have to miss class due to travel, conferences, research, etc., this is fine—just let me know in advance.

Learning outcomes

By the end of the class, the goal is that you will be able to:

• Use R with packages like ape, phangorn, etc to manipulate and display phylogenetic trees
• Apply methods of inferring phylogenetic trees from sequence data using parsimony, distance, likelihood, and Bayesian methods
• Use software to combine and summarize sets of trees using consensus methods and supertree methods
• Learn the basics of the multispecies coalescent with applications to inferring species trees, hybridization networks, and species delimitation from gene trees or sequence data
• Perform your own simulation studies using shell scripts in Linux or Mac OS X to put a sequence of programs together into a pipeline to answer a scientific question.
Disability statement

If you have a documented disability that will impact your work in this class, please contact me to discuss your needs. You’ll also need to register with the Accessibility Resource Center in 2021 Mesa Vista Hall (building 56) across the courtyard east from the SUB.

Title IX statement

In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered responsible employees by the Department of Education (see pg 15 - http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu). For more information on the campus policy regarding sexual misconduct, see: https://policy.unm.edu/university-policies/2000/2740.html