Introduction to Phylogenetic Analysis

Thursday 10 July, 2014

Overview

This workshop will provide an introduction to the principles and practice of molecular phylogenetic analysis. The workshop is suitable for beginners and will comprise a series of lectures and practical exercises. Using two popular packages for phylogenetic analysis, MEGA and BEAST, participants will learn how to select models, infer phylogenies, and estimate timescales from DNA sequence data.

The workshop will be held in a computing lab (Dry Lab 2) in the Charles Perkins Centre at the University of Sydney. It will be run by A/Prof Simon Ho (simon.ho@sydney.edu.au), with assistance from Daej Arab. The workshop will involve a series of lectures and practicals. The practical exercises will involve basic analyses of a prepared data sets using desktop PCs. We will be using free phylogenetic software that can be installed on PC, Mac, and UNIX platforms.

Programme

09.00 – 09.15 Arrival and set-up
09.15 – 09.30 Introduction to the workshop
09.30 – 10.00 Lecture: Principles of phylogenetic analysis
10.00 – 10.15 Practical: Sequence alignment
   Tea break
10.30 – 11.15 Lecture: Phylogenetic methods and models
11.15 – 12.30 Practical: Parsimony, distance methods, and likelihood
   Lunch break
13.30 – 14.30 Lecture: Bayesian phylogenetic analysis
14.30 – 16.30 Practical: Bayesian analysis and molecular clocks
Useful references

Introductory books on phylogenetics

- *The Phylogenetic Handbook*
- *Reading the Story in DNA*
- *Inferring Phylogenies*
- *Molecular Evolution: A Phylogenetic Approach*

Bayesian phylogenetic analysis

- *Bayesian inference of phylogeny: a non-technical primer*
- *Bayesian phylogenetics with BEAUti and the BEAST 1.7*
- *BEAST: Bayesian evolutionary analysis by sampling trees*

Molecular clocks and calibrations

- *Molecular-clock models for estimating evolutionary rates and timescales*
- *The changing face of the molecular clock*
- *Accounting for calibration uncertainty in phylogenetic estimation of evolutionary divergence times*