**MrBayes**

Motivation:

<http://blog.ted.com/how-a-ted-fellow-is-working-to-save-african-cassava/>

Bayesian Inference:

<https://www.youtube.com/watch?v=5NMxiOGL39M>

Github for Dataset:

<https://github.com/anders-savill/mrbayes-scc17>

Thinking:

Creating evolutionary trees, maximizing (Model | measure)

MonteCarlo: randomness

Markov change: the next point depends on the prior point (think the tree itself)

MCMC:

<https://www.youtube.com/watch?v=OTO1DygELpY>

Simple tutorial:

<http://evomics.org/learning/phylogenetics/mrbayes/>

<http://mrbayes.sourceforge.net/wiki/index.php/Tutorial_3.2>

Terminology/Key resource:

<http://treethinkers.org/tutorials/mrbayes/#Manipulating_Markov_chain_Monte_Carlo_MCMC_Settings>

Manual:

<http://mrbayes.sourceforge.net/wiki/index.php/Tutorial_3.2>

Steps:

1. Read the Nexus data file
2. Set the evolutionary model
3. Run the analysis
4. Summarize the samples

Specification comes in the setting of the model

The setting of the params for execution, not really in the model itself

Need to get a sense of the time it will take to run

<http://mrbayes.sourceforge.net/manual.php>

* Uses MPI
* Both memory and compute heavy
* Relies on the BEAGLE library (large performance increase with NVIDIA cards, some improvement without them too, can work without downloading this library though)
  + BEAGLE is a high-performance library that can perform the core calculations at the heart of most Bayesian and Maximum Likelihood phylogenetics package. <http://beast.bio.ed.ac.uk/beagle>
  + Doesn’t support OpenCL
* Interpreter style interface

Background:

* Performs “Bayesian inference and model choice across a large space of phylogenetic and evolutionary models”
  + <https://en.wikipedia.org/wiki/Bayesian_inference_in_phylogeny>
* Basically taking in dna data and trying out different possible trees then outputting likelihoods
* Understanding of math and the model you are simulating to set parameters
  + Bayesian inference
    - <https://www.youtube.com/watch?v=5NMxiOGL39M>
  + Evolutionary trees
  + Monte Carlo Simulations
    - <https://en.wikipedia.org/wiki/Monte_Carlo_method>
  + Markov chains

Compilation

* Download: <http://mrbayes.sourceforge.net/download.php>
* cd src
* autoconf
* ./config --with-beagle=no
* Make

Following example in the manual:

Red oval indicate expected time left









