

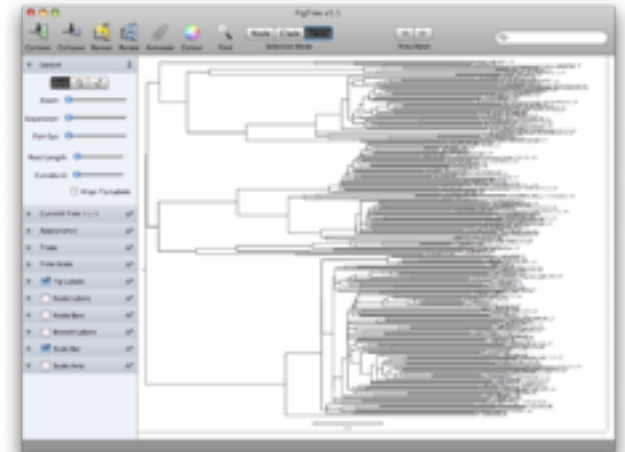
# Plotting phylogenies in R

Catherine Sheard & Fiona Jordan



# How do I plot a phylogeny?

- Fig Tree:
  - Free.
  - Point-and-click (very easy to use!)
  - Not suitable for large phylogenies.
  - Not easily reproducible.
- Traditional R-based options:
  - *phytools* (Liam Revell)
  - *ape* (Emmanuel Paradis)
  - *geiger* (Luke Harmon)
  - Steep learning curve.
- New R-based option: ggtree.
- Many others!



## Methods in Ecology and Evolution

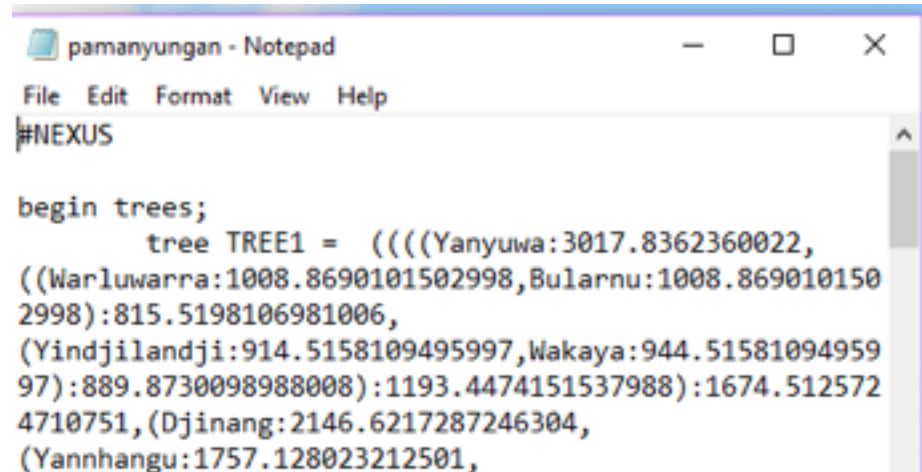
Application

**GGTREE: an R package for visualization and annotation of phylogenetic trees with their covariates and other associated data**

Guangchuang Yu, David K. Smith, Huachen Zhu, Yi Guan, Tommy Tsan-Yuk Lam

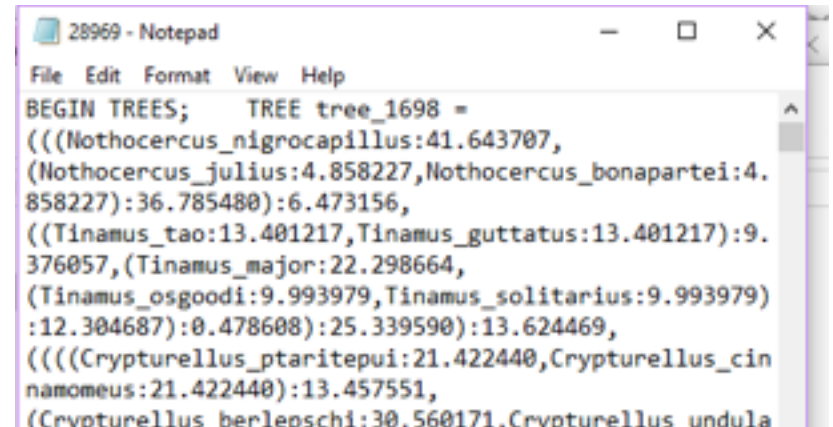
# What types of phylogenetic trees can R cope with?

- NEXUS
  - read.nexus, write.nexus
  - From PAUP\*, MrBayes, Mesquite, etc
- Newick
  - read.tree, write.tree
  - Named after Newick's restaurant in Dover, New Hampshire.
  - From PHYLIP, etc
- And others, probably.



```
pamanyungan - Notepad
File Edit Format View Help
#NEXUS

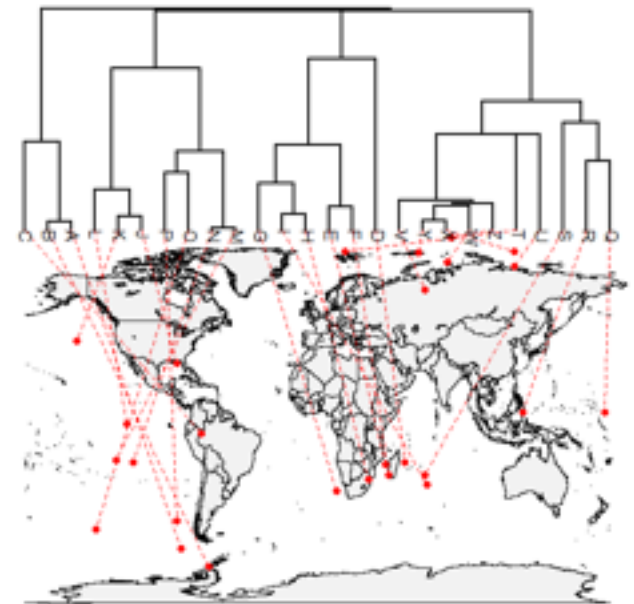
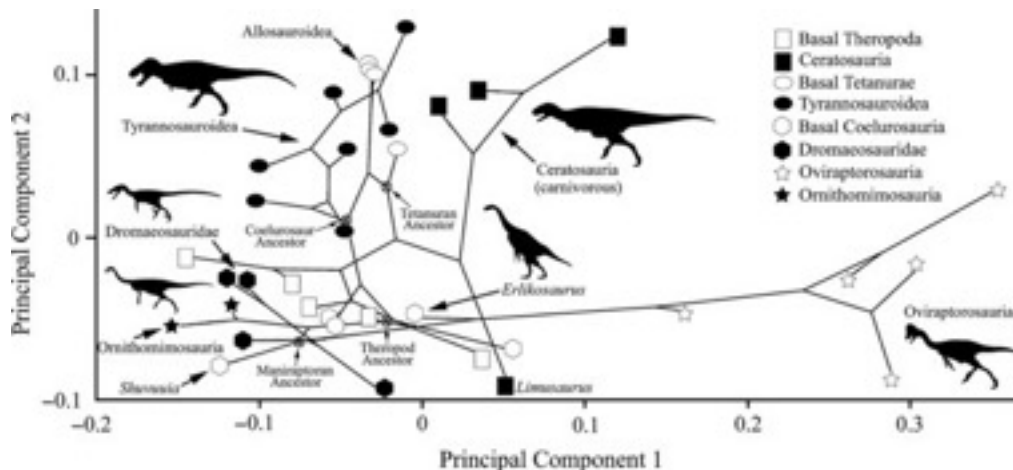
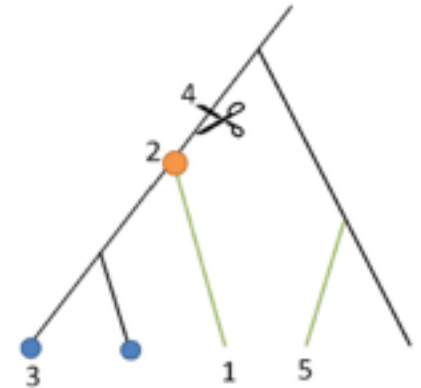
begin trees;
  tree TREE1 = (((Yanyuwa:3017.8362360022,
((Warluwarra:1008.8690101502998,Bularnu:1008.869010150
2998):815.5198106981006,
(Yindjilandji:914.5158109495997,Wakaya:944.51581094959
97):889.8730098988008):1193.4474151537988):1674.512572
4710751,(Djinang:2146.6217287246304,
(Yannhangu:1757.128023212501,
```



```
28969 - Notepad
File Edit Format View Help
BEGIN TREES; TREE tree_1698 =
(((Nothocercus_nigrocapillus:41.643707,
(Nothocercus_julius:4.858227,Nothocercus_bonapartei:4.
858227):36.785480):6.473156,
((Tinamus_tao:13.401217,Tinamus_guttatus:13.401217):9.
376057,(Tinamus_major:22.298664,
(Tinamus_osgoodi:9.993979,Tinamus_solitarius:9.993979)
:12.304687):0.478608):25.339590):13.624469,
((((Crypturellus_ptaritepui:21.422440,Crypturellus_cin
namomeus:21.422440):13.457551,
(Crypturellus_berlepschi:30.560171,Crypturellus undula
```

# What sorts of things can I do in R?

- Manipulate trees
- Plot traits & ancestral states on trees
- Plot trees into morphospace
- Plot trees on maps



Brusatte et al 2011. The evolution of cranial form and function in theropod dinosaurs JEB

<http://blog.phytools.org/2013/07/>



# Where do I go for help?

- The internet is amazing.
  - Liam Revell's blog (author of phytools) is particularly good.
- R-sig-phylo mailing list. We're really friendly!

**Phylogenetic Tools for Comparative Biology**

Home Comments [phytools page](#) [phytools on CRAN](#) [Lab webpage](#)

TUESDAY, JULY 30, 2013

**New phylo.to.map with direct projection of the tree onto a geographic map**


A few days ago I added the option to directly project a phylogeny onto a geographic map into the 53 method `plot.phylo.to.map`. The most recent phytools version ([phytools 0.3-20](#)) is available from my website. It also allows the use of alternative map databases and maps. Here's a quick demo:

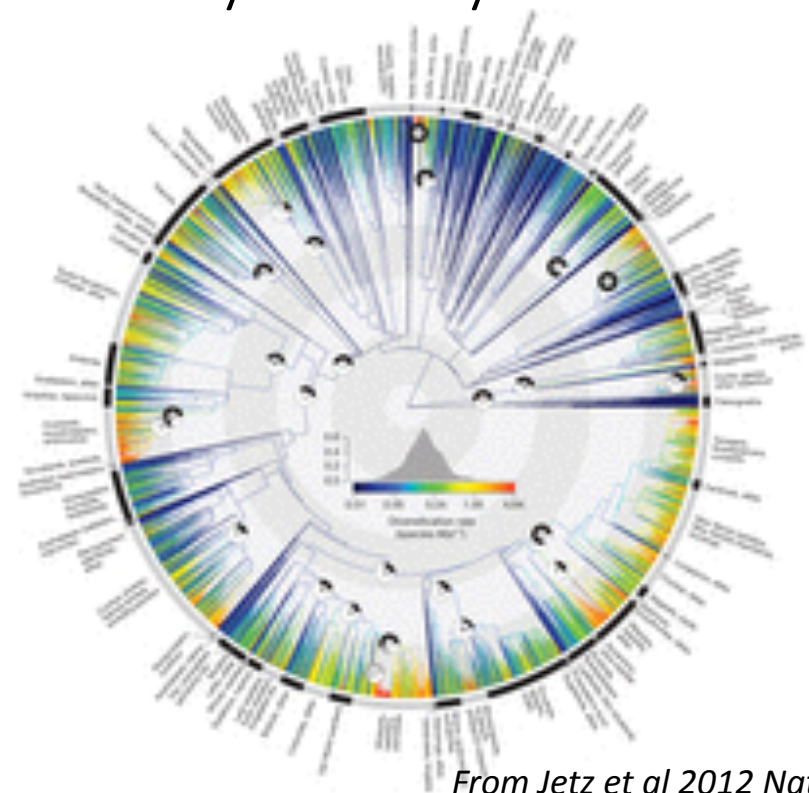
```
> require(phytools)
Loading required package: phytools
> packageVersion("phytools")
[1] "0.3.20"
> require(mapdata)
Loading required package: mapdata
> xcc=phylo.to.map(tree,cbind(lat,lon),
  database="worldHires",plot=FALSE)
objective: 288
...
objective: 76
> # first, let's plot the phylogram visualization
> plot(xcc,type="phylogram",asp=1.3)
```

**ABOUT THIS BLOG**

This web-log chronicles the development of new tools for phylogenetic analyses in the **phytools** R package. Unless you're reading a very recent page of the blog, I recommend that you install the **latest CRAN version of phytools** (or latest **beta release**) before attempting to replicate any of the analyses of this site. That is because the linked functions may be archived, and very likely have been replaced by newer versions.

**ABOUT ME**

 **Liam Revell**  
[View my complete profile](#)



*From Jetz et al 2012 Nature*

# Tutorial: Pama-Nyungan phylogeny from Bower and Atkinson 2012

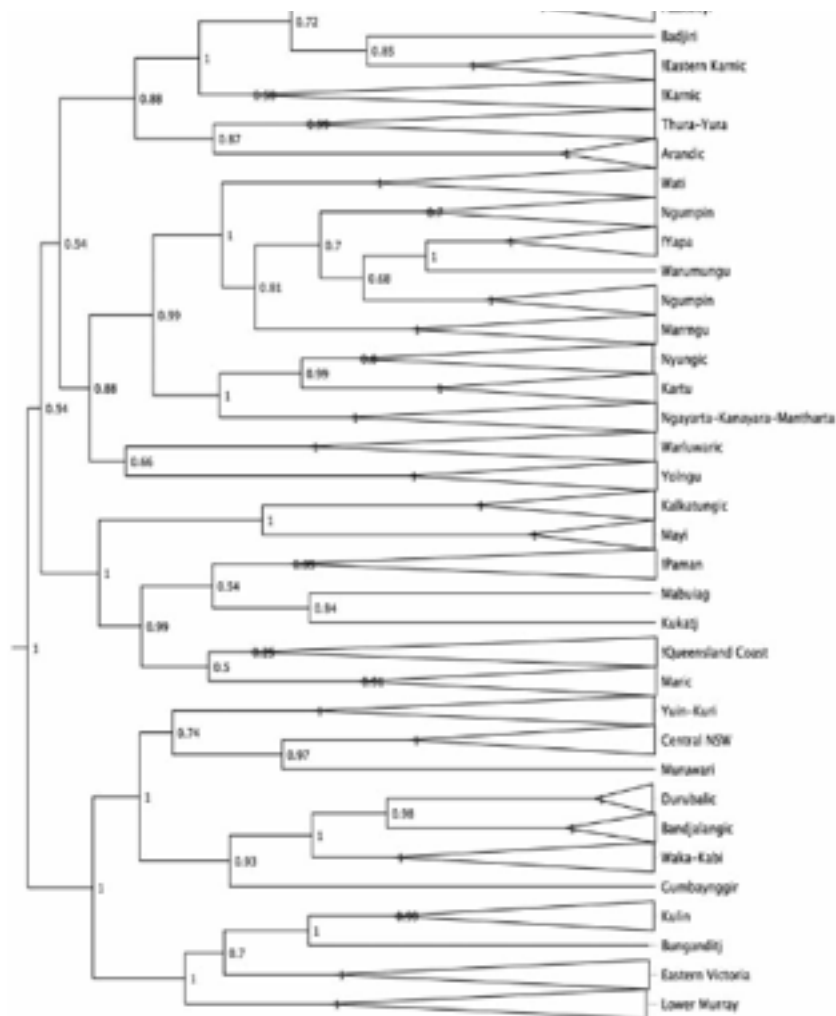


FIGURE 4. Languages included in the sample.

Bower, C, and Atkinson, Q. (2012) Computational phylogenetics and the internal structure of Pama-Nyungan. *Language* 88, 817-845.