





What do you see?



Interactions



Interactions

cow eats grass



(co)Evolution



(co)Evolution

cow's stomach digest grass

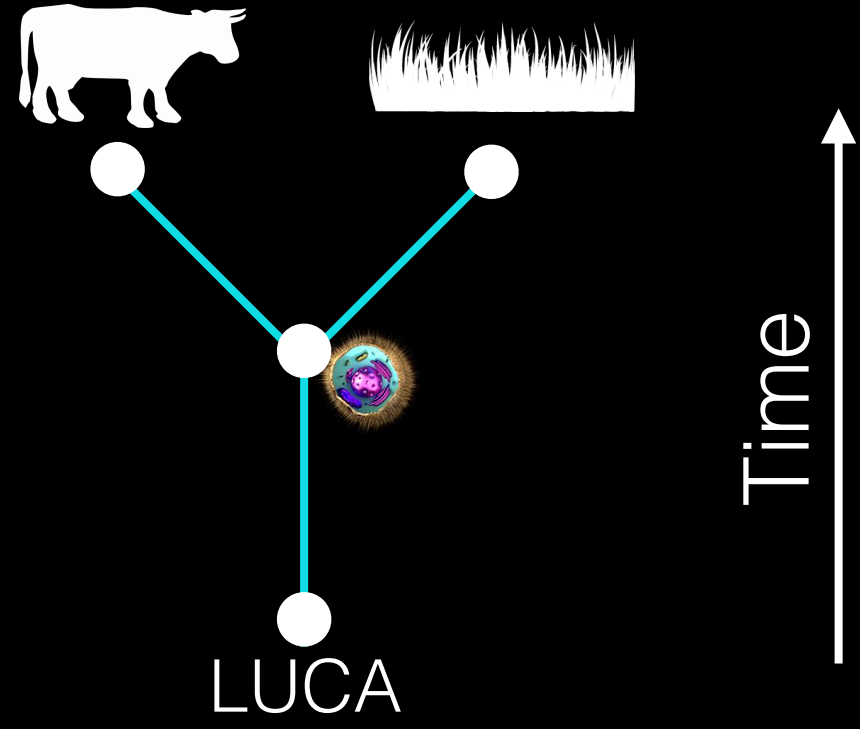
Stewart CB, Schilling JW, Wilson AC. Adaptive evolution in the stomach lysozymes of foregut fermenters. *Nature*. 1987;330(6146):401.



How do you write it?

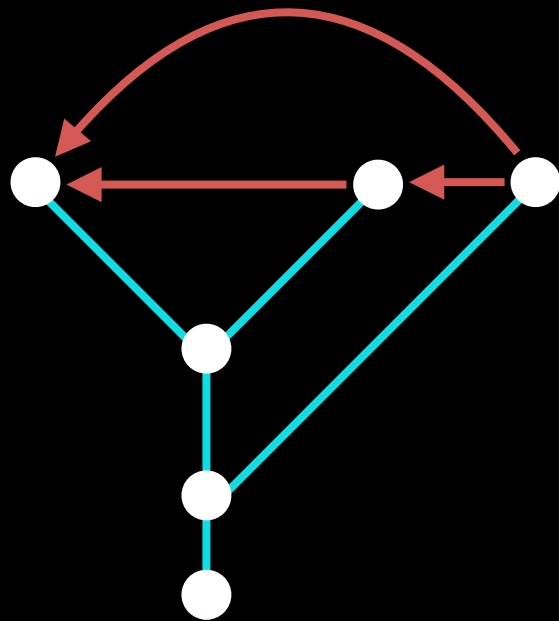
(if you are a mathematician)

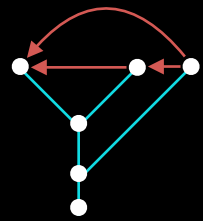




the Web and the Tree

on the interplay between ecological processes and
evolutionary histories





the Web and the Tree

on the interplay between ecological
processes and evolutionary histories

Giulio Valentino Dalla Riva

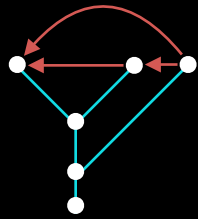
Supervisors:

Mike Steel

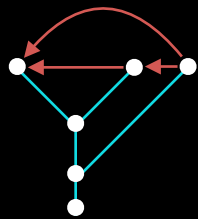
Charles Semple

Daniel Stouffer

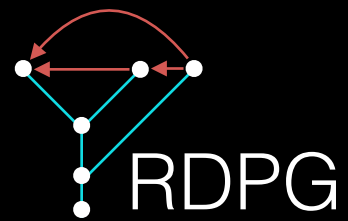
University of Canterbury 31 March 2016



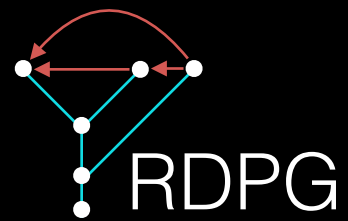
1. Random Dot Product Graphs (Chap. 4)
2. Centrality & Uniqueness (Chaps. 5 & 7)
3. Niche Evolution and Diversity (Chap. 6)



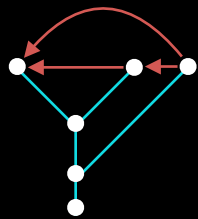
RDPG



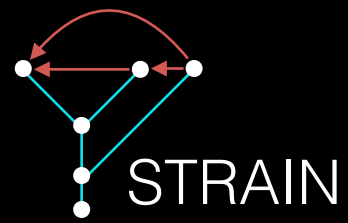
Did evolution leave a trace
in the topological structure
of ecological networks?



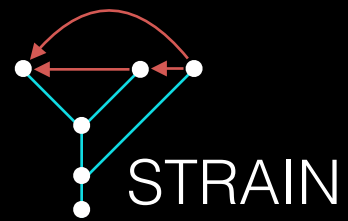
How do we do
phylogenetic comparative analysis
with food webs?



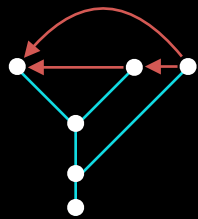
CENTRALITY



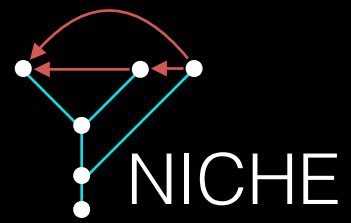
Are ecological unique species
evolutionary distinctive?



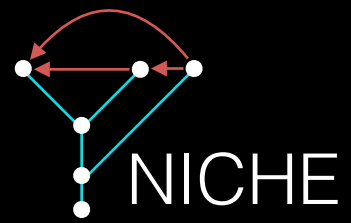
How do we measure
the importance of nodes
in a RDPG framework?



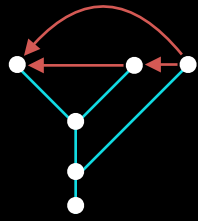
NICHE



How do species' niches evolve?



How do we detect the effect
of interactions
in species' evolution?



*Because we are all responsible for all
[...]
I go for all [...]*

*–Fyodor Dostoyevsky
The Brothers Karamazov*