¶1: Interactions fuel ecological and evolutionary processes

* How does complexity and diversity arise? But more specifically, what is the role of species interactions – both antagonistic and mutualistic – in driving the emergence of complexity and diversity on evolutionary timescales?
* Networks! They both reduce the complexity of the natural world to something manageable, while retaining enough descriptive power and biological meaning to be useful tools to investigate the complex dynamics of ecosystems
* Both structure and dynamics can be explored using networks. But here we make the point that, while dynamics (i.e. population dynamics) that capture the flow of energy/biomass across a network are very useful for exploring ecological interactions, they are often prohibitively complex for exploring evolutionary-scale questions at the level of the community.
* Transition sentence – the dynamics of structure is an appropriate in-between scale that may offer important insights into eco-evolutionary process operating on communities

¶2: Adaptive/dynamic networks and eco-evolutionary dynamics

* Here we briefly lay out the relevant (recent) history concerning the use of dynamic structural models to explore a) ecological and b) evolutionary process within **communities**
* Ecological models: island biogeography and food webs (see Gravel et al.)
* Evolutionary models: Drossel, Kat Shea?, others?
* A model combining assembly, ecology and (macro)evolutionary dynamics could be of high interest as many aspects of community structure are either shown or suspected to be a product of the interaction of ecology and (macro)evolution

¶3: Interactions have many flavors

* Whilst a lot of research focuses on foodwebs there is a growing interest in models incorporating multiple types of interactions and especially mutualisms
* Prior efforts: we outline some in our 2018 paper
* Transition: even the effects of species on the environment can be included (cite our 2018 model)

¶4: Here we…

* Build upon the approach introduced by Yeakel et al. 2018 to explore the influence of multi-type interactions on the eco-evolutionary dynamics of communities.
* We propose a model that combines all these dynamics and features and show that, given the right parameters, it produces complex and diverse networks and can be simulated over macroevolutionary timescales
* We will address these questions
* List main questions and themes…

¶5: We find…

* List primary conclusions…
* A central field of interest in ecology is how the complexity and diversity of ecosystems we see all around the globe evolved
* Networks are a great tool to make sense of the complex dynamics of ecosystems
* A promising candidate to get a better understanding are dynamic/adaptive network models (compared to static ones)
* There are assembly models and evolutionary models which have their pros and cons and produce good results
* Are there models that combine the two aspects?
* A model combining assembly, ecology and (macro)evolutionary dynamics could be of high interest as many aspects of community structure are either shown or suspected to be a product of the interaction of ecology and (macro)evolution
* Whilst a lot of research focuses on foodwebs there is a growing interest in models incorporating multiple types of interactions and especially mutualisms
* We propose a model that combines all these dynamics and features and show that, given the right parameters, it produces complex and diverse networks and can be simulated over macroevolutionary timescales