


A complex network diagram with numerous nodes and edges, rendered in a light gray color against a dark gray background. The nodes are small circles, and the edges are thin lines connecting them, forming a dense, interconnected web.

NOVEMBER 11, 2014

# Macroevolution of ecological networks

Timothée Poisot

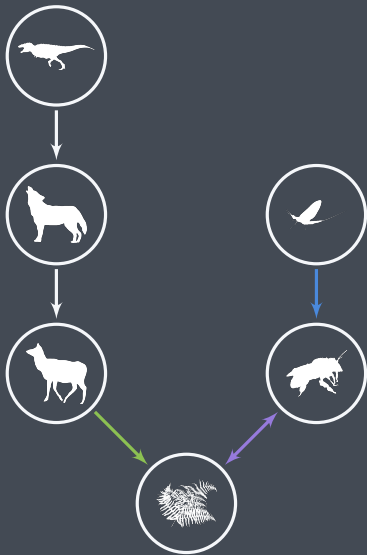
A complex network diagram with numerous nodes and connecting lines, rendered in a light gray color against a dark blue-gray background. The nodes are small circles, and the lines are thin, creating a web-like structure that fills the entire frame.

**Twitter:** @tpoi @PoisotLab

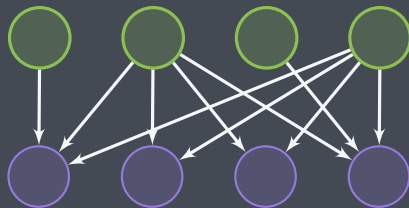
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<http://dx.doi.org/10.6084/m9.figshare.1217578>

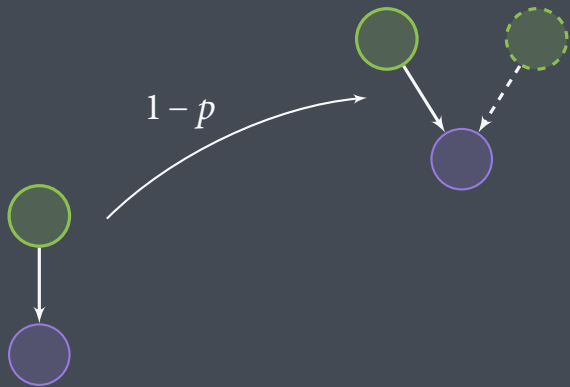




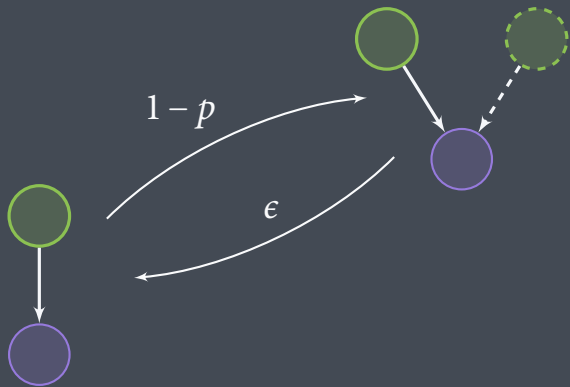


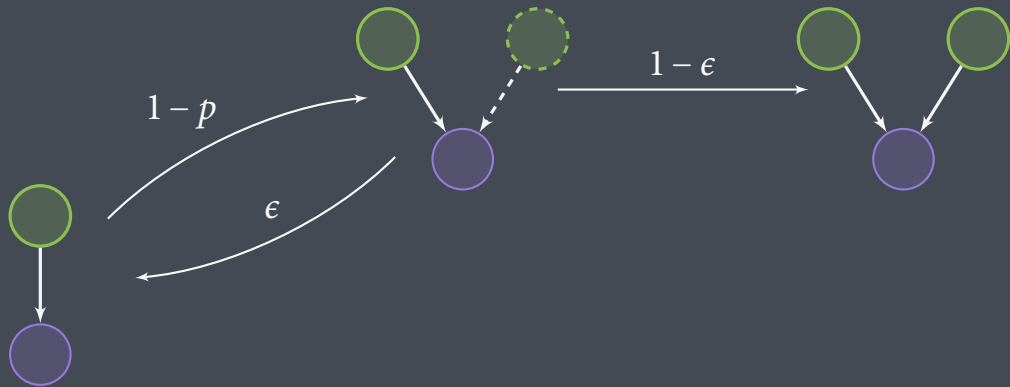
$$\frac{d}{dt}x = \frac{1}{2}\mu\sigma^2 N^*(x) \frac{\partial}{\partial x'} \omega(x', x)$$

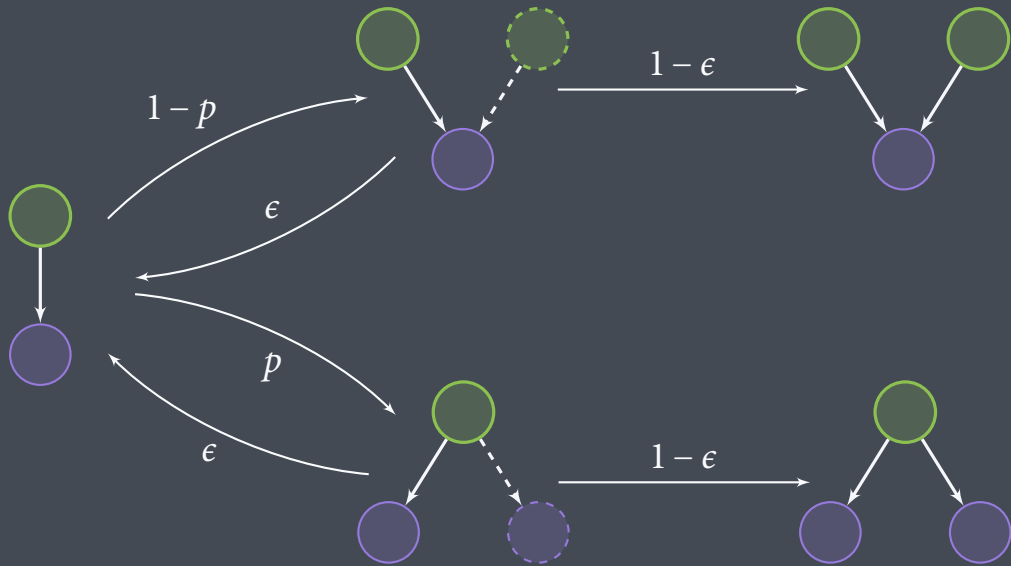


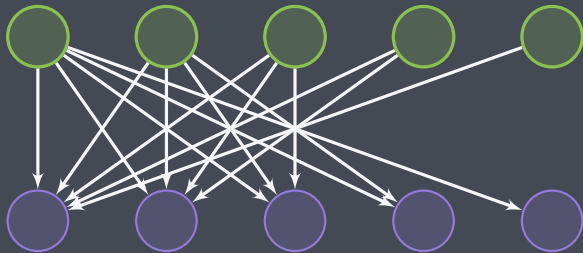


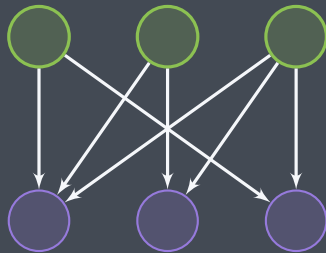
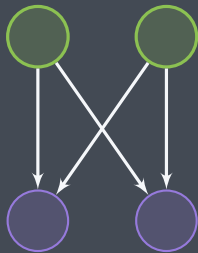


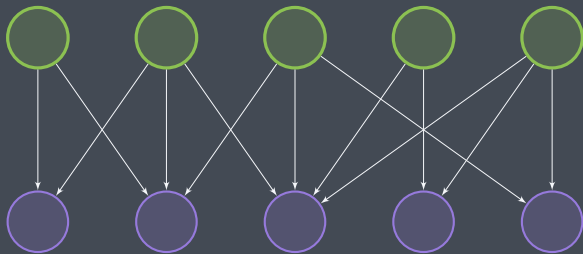


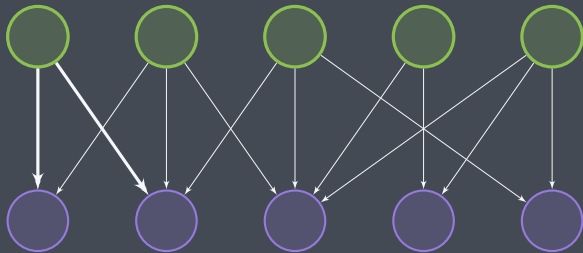


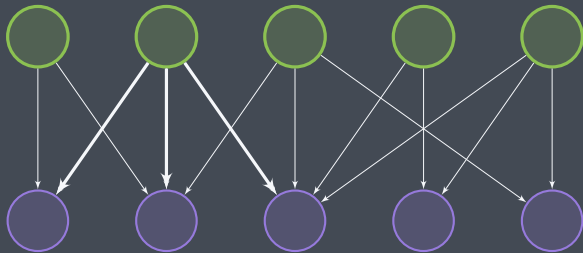




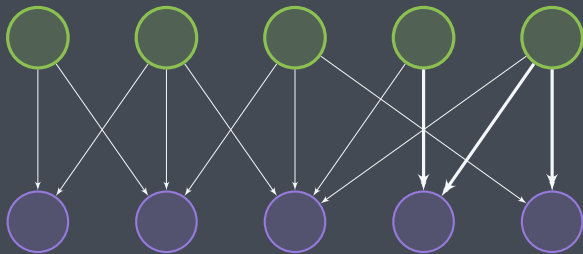


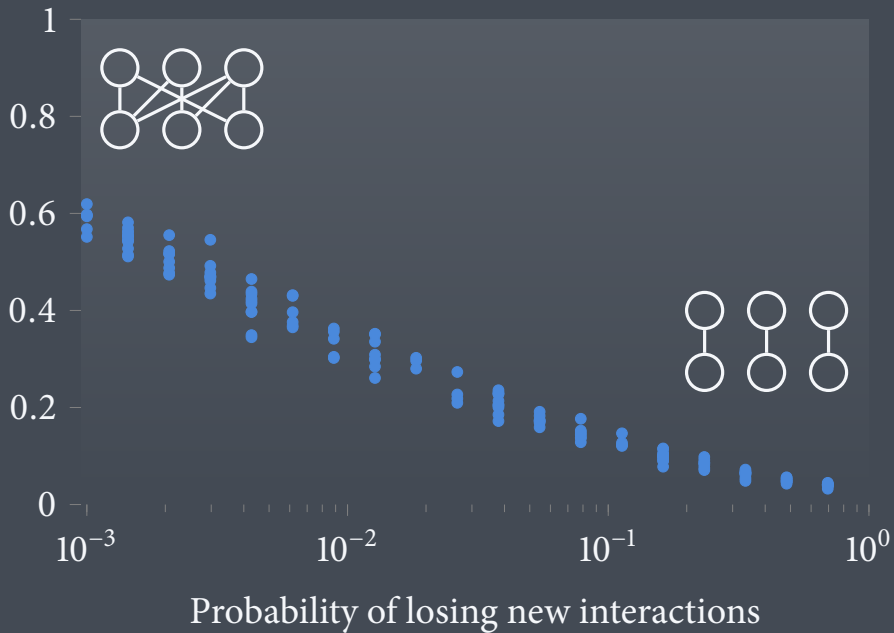


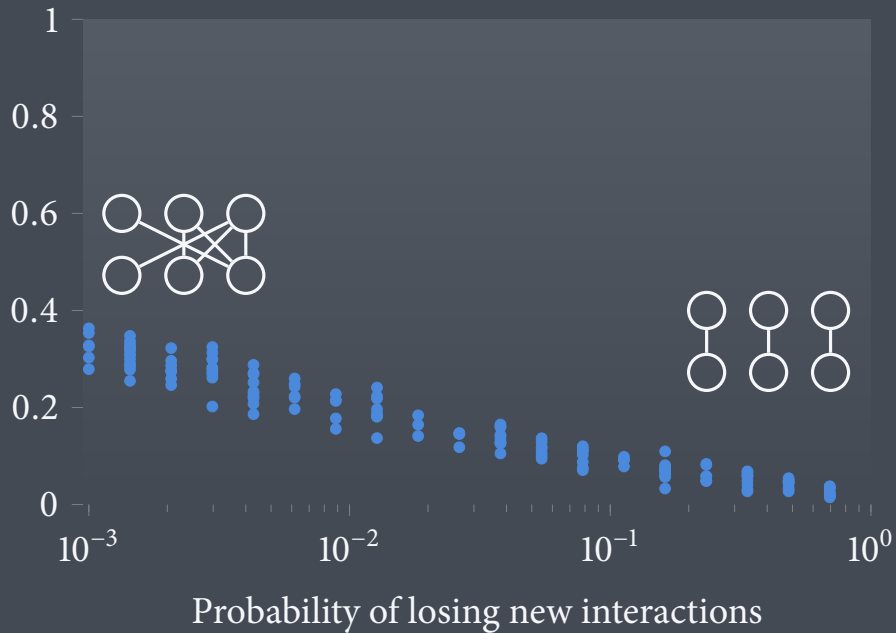


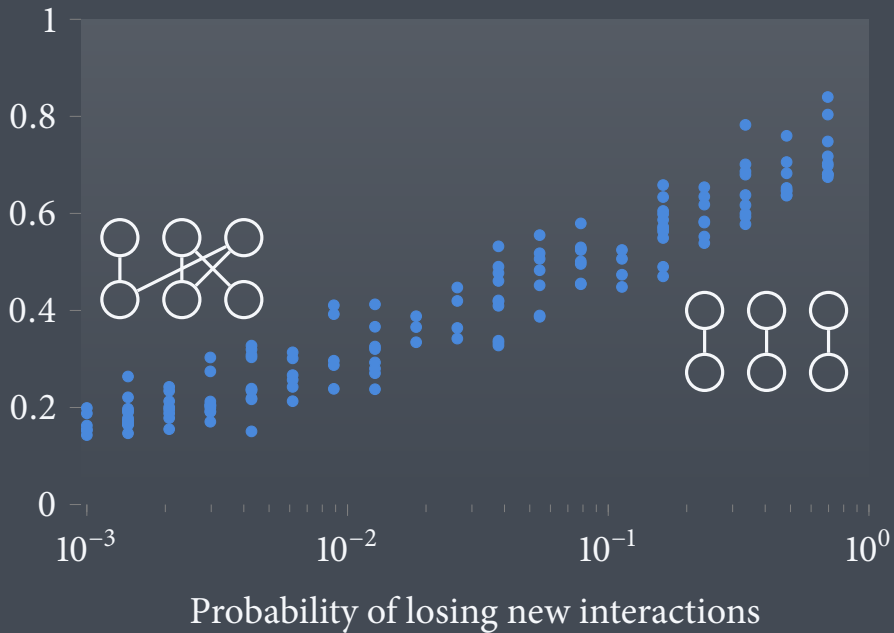












$$f(\theta) = \mathbf{S}_{\text{sim.}} \approx \mathbf{S}_{\text{obs.}}$$

- ▶ draw parameter set  $\theta$  from the prior

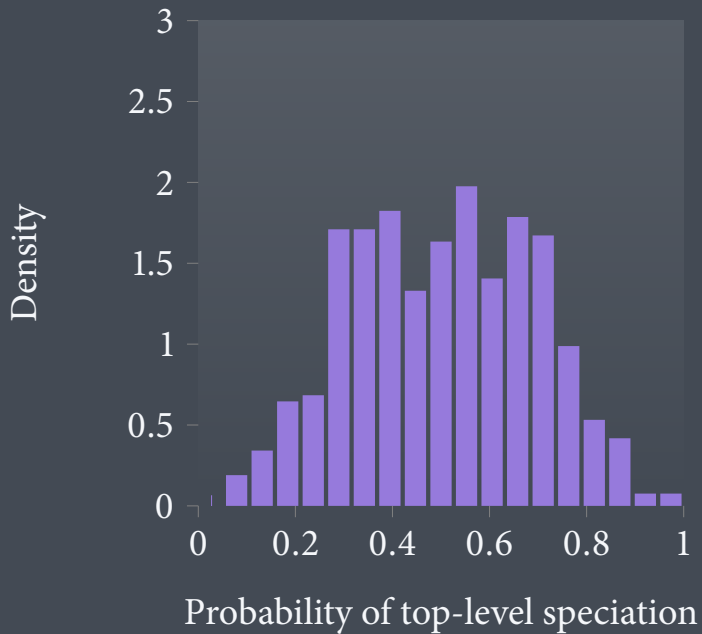
- ▶ draw parameter set  $\theta$  from the prior
- ▶ simulate network

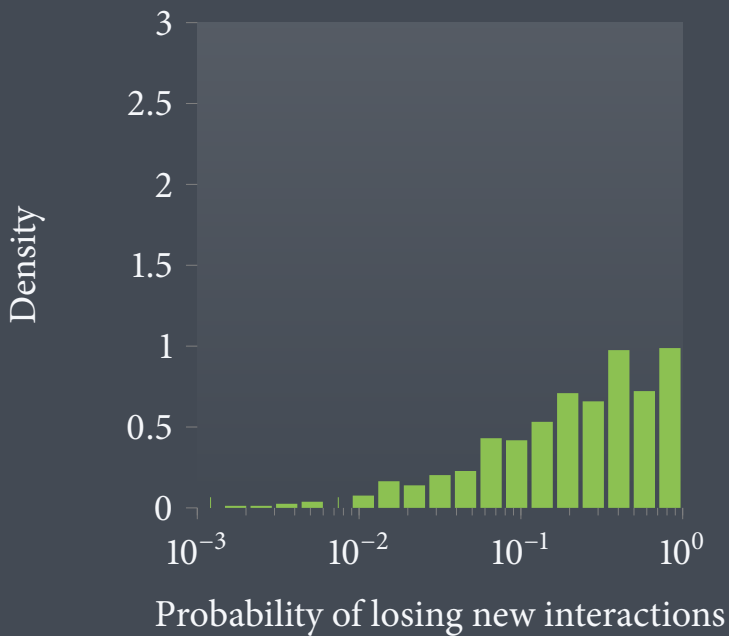
- ▶ draw parameter set  $\theta$  from the prior
- ▶ simulate network
- ▶ compute  $\mathbf{s}_{\text{sim}}$ .

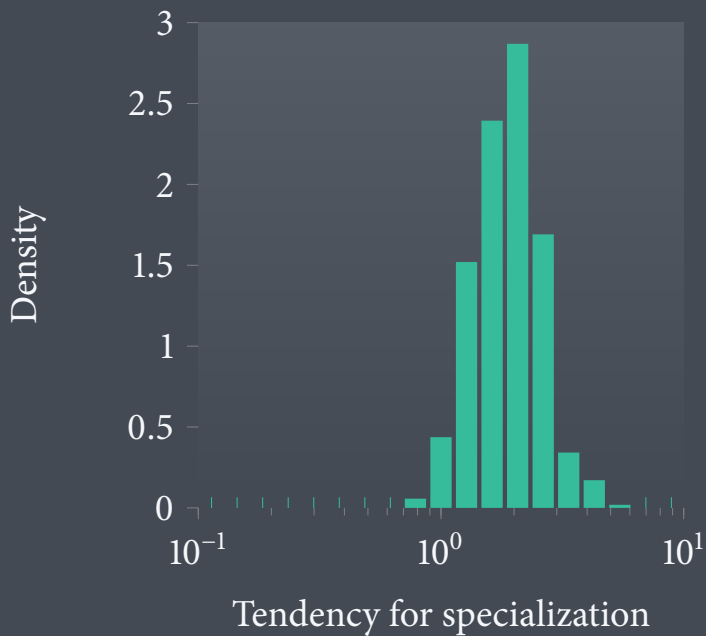


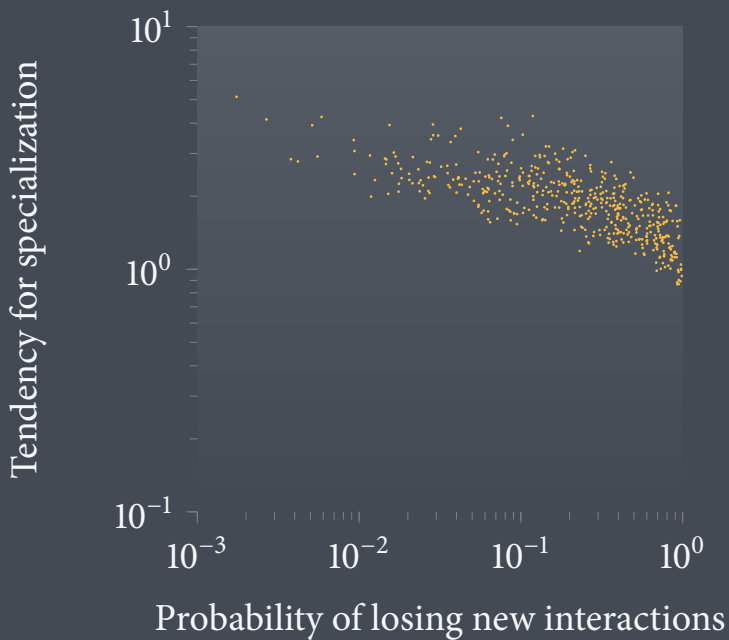
- ▶ draw parameter set  $\theta$  from the **prior**
- ▶ simulate network
- ▶ compute  $\mathbf{s}_{\text{sim.}}$
- ▶ measure distance  $d_\theta$  between  $\mathbf{s}_{\text{sim.}}$  and  $\mathbf{s}_{\text{obs.}}$

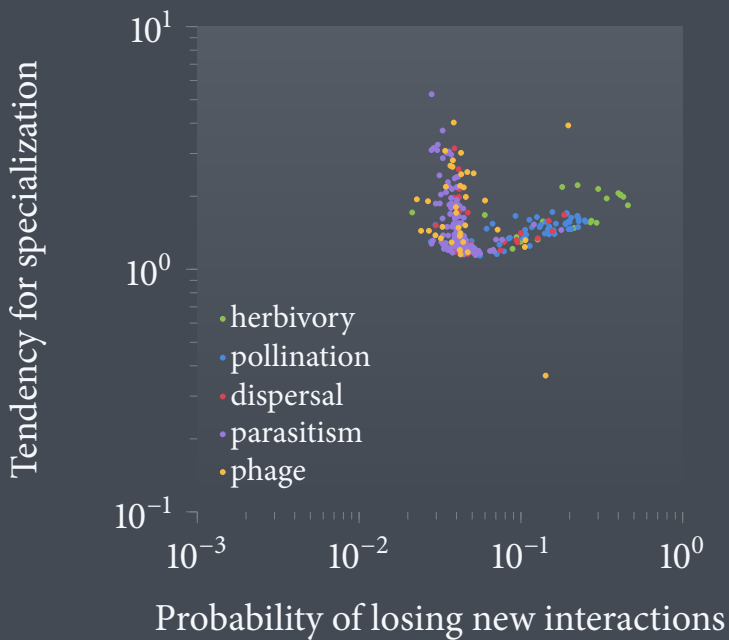
- ▶ draw parameter set  $\theta$  from the **prior**
- ▶ simulate network
- ▶ compute  $\mathbf{s}_{\text{sim.}}$
- ▶ measure distance  $d_\theta$  between  $\mathbf{s}_{\text{sim.}}$  and  $\mathbf{s}_{\text{obs.}}$
- ▶ is  $d_\theta$  small? Yeah, we have the **posterior**!

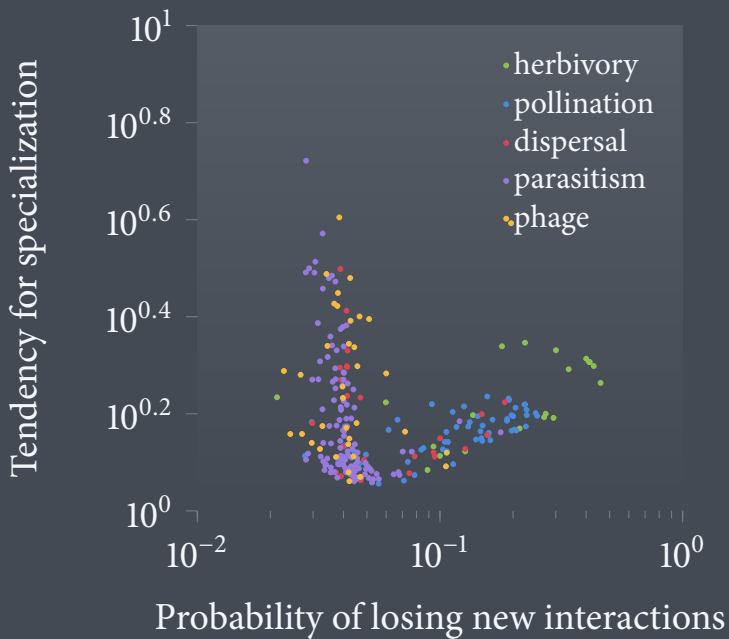




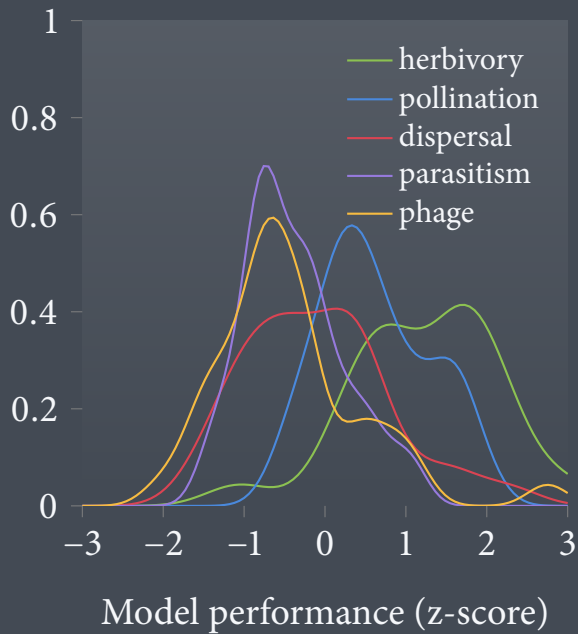















network structure is predicted by  
**simple evolutionary rules**

types of networks differ on their  
**tendency to retain interactions**



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**Made with:**  $\text{\LaTeX}$ , pgfplots, tikz, a baby bashing on the keyboard

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