

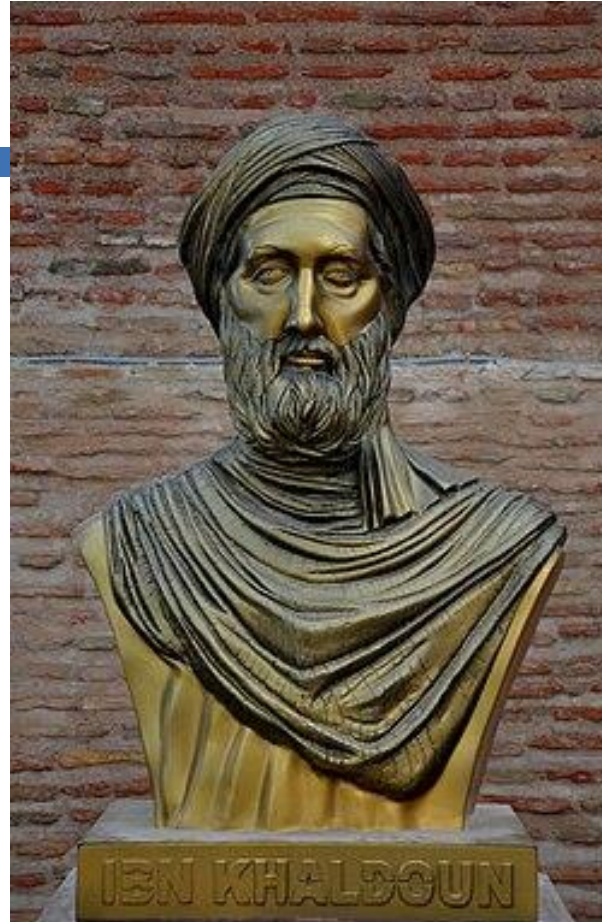
Animal Social Networks and Pro-social Animal Behavior

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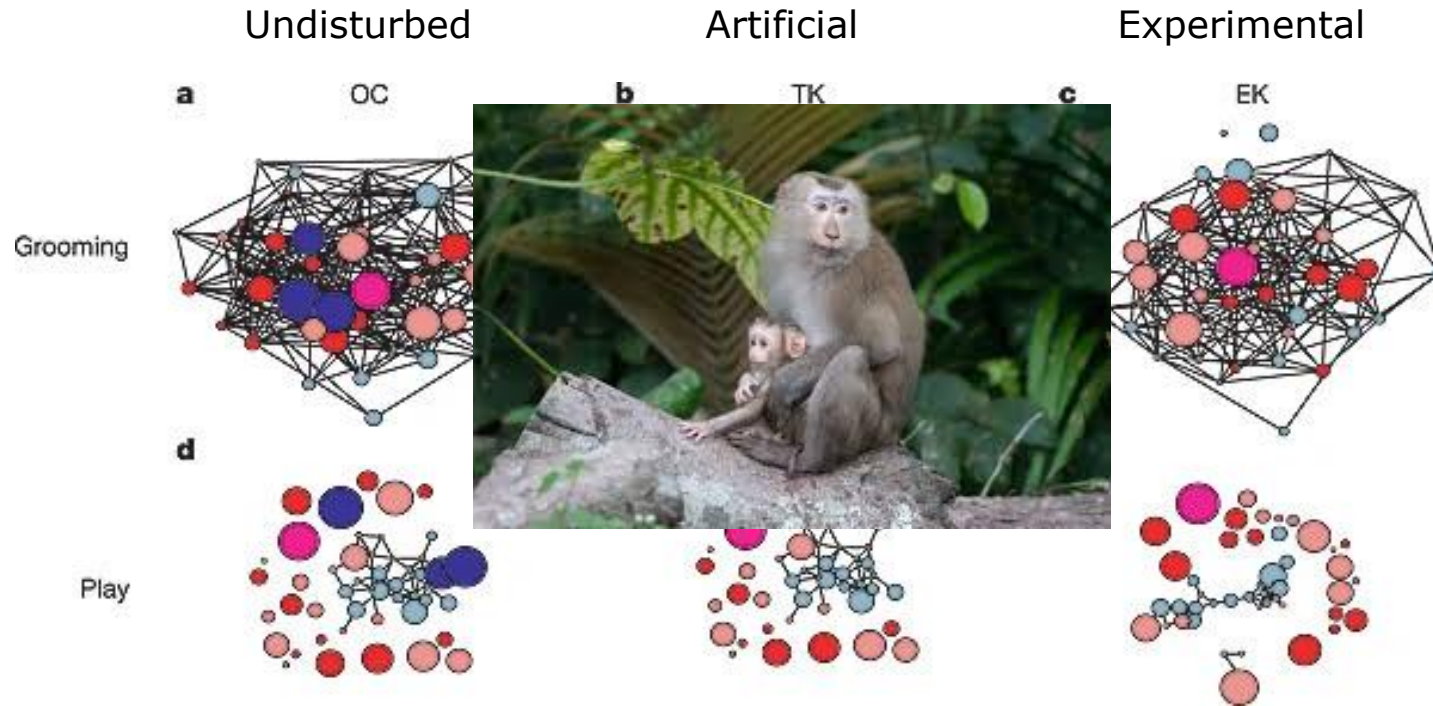
Are we, as humans, a tournament or non-tournament species?

Trait	Tournament	Non Tournament
Aggression		
Variability		
Lifespan		
Parental behavior		
Selection criteria	Big	Parental



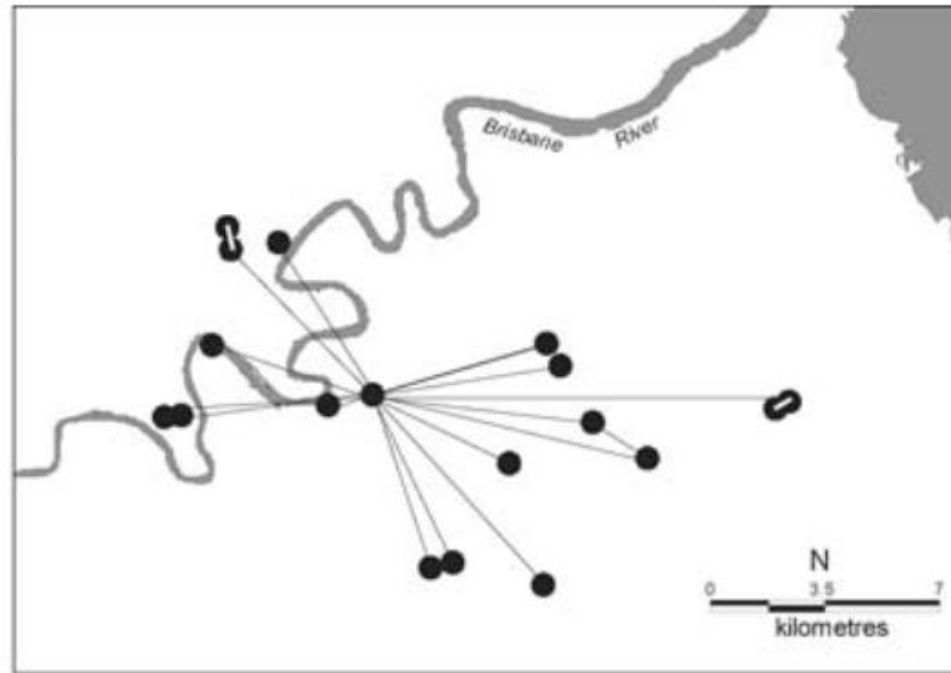
Rocky – Project Hail Mary

Vulnerability in primate social networks



Flack, Jessica C., et al. "Policing stabilizes construction of social niches in primates." *Nature* (2006).

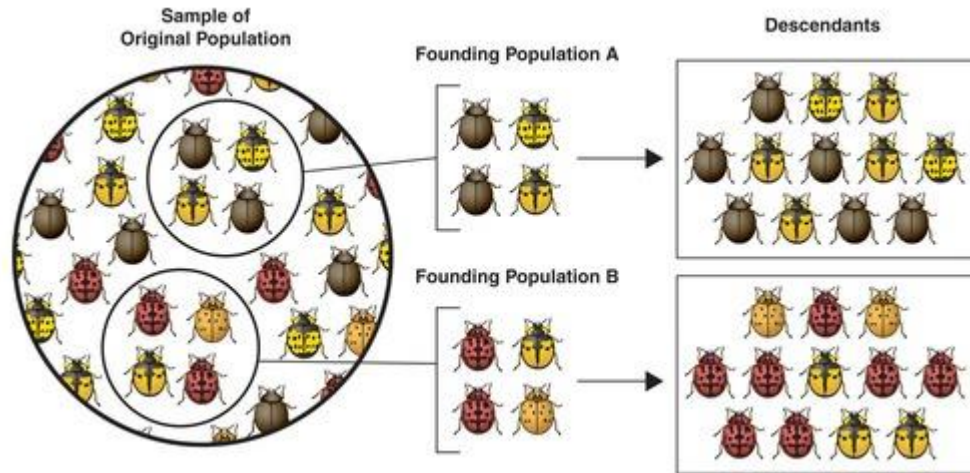
Vulnerability of habitats to Anthropogenic Effects



Rhodes, Monika, et al. "Applying network analysis to the conservation of habitat trees in urban environments: a case study from Brisbane, Australia." *Conservation Biology* (2006).

Behavioral Biology 'explains' many social behaviors

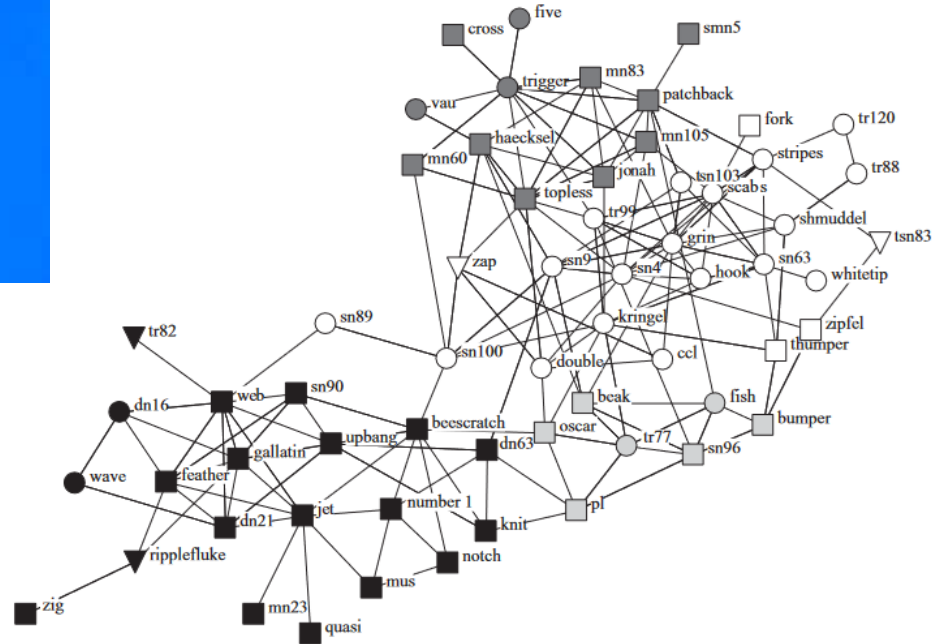
- Kin Selection
 - Grooming
 - Group / multi-level
- Reciprocal Altruism
 - Prisoners Dilemma
- Competition
 - Mating: Inter vs Intra
 - Hierarchy
- The founder effect





* Prof. Robert Sapolsky, The biology of behavioral evolution, Stanford

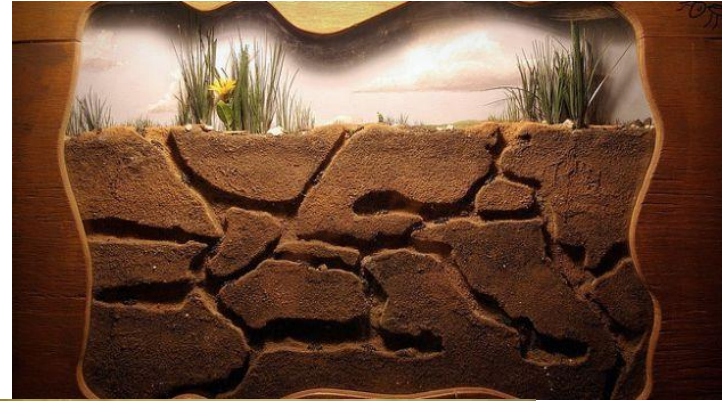
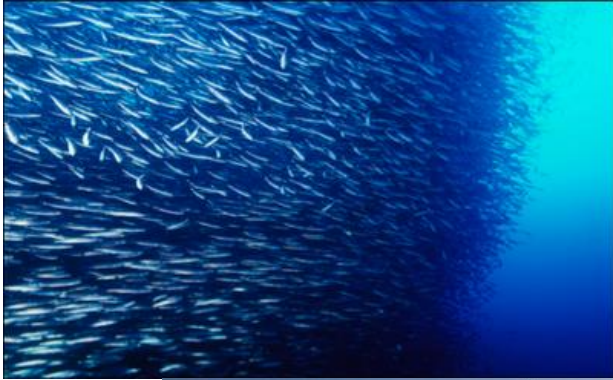
Dolphins are 'more' assortative than humans



Lusseau, David. "The emergent properties of a dolphin social network." *Proceedings of the Royal Society of London*. (2003).

Birds of a feather flock together

“Network measures provide a way to describe a continuum of social complexity that captures the social relationships within the group.”



Sampling Marmots in the Rocky Mountains

- Individually marked & monitored
- What network measures have clearest trends?
 - Measures based on direct interactions
 - Degree centrality
 - Density
- What measures are more robust to sampling?
 - Measures based on **indirect** interactions
 - Betweenness centrality
 - Diameter



Issues applying SNA to animal behavior

“It is essential to carefully define a network in a way that reflects a biologically relevant level of resolution”

- Spatial constraints
 - Movement ability, habitat topology and resource distribution
 - Separating social networks from shared space networks
- Temporal limitations
 - Relationships are often unstable
- Sampling