

# Finding structure in dynamic networks (and what it means for zebras)

Tanya Berger-Wolf

University of Illinois, USA

## Abstract

Social creatures interact in diverse ways: forming groups, mating, sending emails, and sharing ideas. Some of the interactions are accidental while others are a consequence of the underlying explicit or implicit social structures. One of the most important questions in sociology is the identification of such structures, which are variously viewed as communities, hierarchies, or “social profiles”.

In analyzing social networks, one property has largely been ignored until recently: interactions and their nature change over time. The notion of “structure” is intricately linked with the dynamics of social interactions. On one hand, it is in longitudinal data that the emergence of structures and the laws governing their development can be observed and inferred. On the other hand, the existence of such structures that constrain social interactions is what allows us to predict the behavior and nature of dynamic networks. The necessity to delve into the dynamic aspects of networking behavior may be clear, yet it would not be feasible without the data to support such explicitly dynamic analysis. Rapidly growing electronic networks, such as emails, the Web, blogs, and friendship sites, as well as mobile sensor networks on cars, humans, and animals, provide an abundance of dynamic social network data that for the first time allow the temporal component to be explicitly addressed in network analysis.

I will present several examples of computational approaches we have developed to infer structure in dynamic networks and show applications of this analysis to population biology, from humans to zebras.