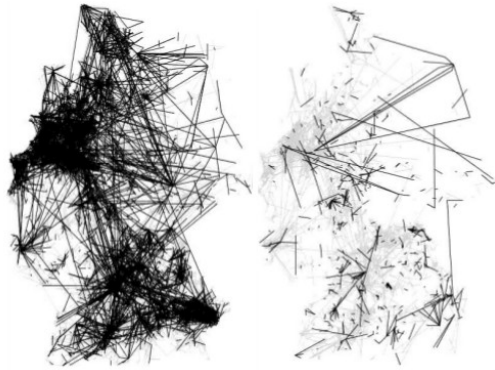
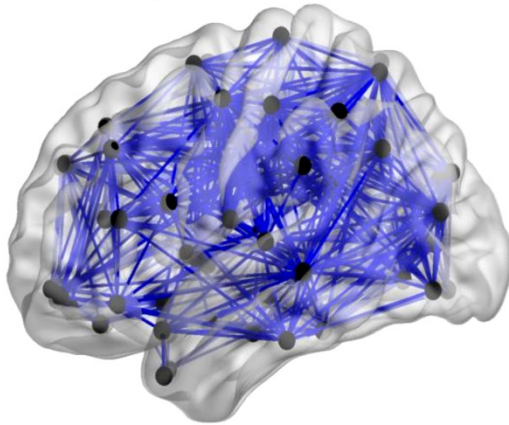


# Empirical Networks and Neurodynamics



*Network of livestock trade in Germany on two different days*

*Network of cortical regions of the human brain*



## Overview of our research:

We analyze empirical networks, e.g., of livestock trade or fMRI measurements of the human brain. We use structures extracted from these data in our numerical simulations of nonlinear models for the investigation of dynamical behavior (spread of disease and neuronal dynamics, respectively). A special focus is put on temporal networks with time-dependent couplings. We study the controllability of time-varying networks, develop novel control schemes and test these on empirical networks.

Our methods include measures from nonlinear dynamics, network science, bifurcation analysis and control theory.

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Co-infection dynamics

Neurodynamics

Disease spreading on livestock-trade networks

Epidemiological processes on temporal networks

Contagion processes and community detection

Neurophysiological networks of the brain