

**Donnerstag**18.07. um 16 Uhr  
Studentinnen/Studenten  
sind herzlich willkommen**Pawel Romanczuk**Humboldt-Universität zu Berlin  
Germany

# Self-organization, Criticality and Collective Information Processing in Animal Groups

Thursday, July 18<sup>rd</sup>, 2024, at 4.00 p.m. c.t.  
Building C6.4, Lecture Hall II

Collective behavior of animals is a fascinating example of self-organization in biology. This phenomenon is believed to provide several advantages to individuals, such as facilitating exchange of social information, promoting accurate collective decisions, or affording protection from predators. It has been theorized that animal collectives should operate in a special parameter region close to a critical point, where various aspects of collective computations become optimal. Here, we discuss the "criticality hypothesis" in the context of collective animal behavior by combining experimental data and individual-based modeling. First, we will analyze self-organized coordination of movement in *Trichoplax adhaerens*, one of the simplest multicellular animals devoid of a central nervous system. Subsequently, we shift our focus to the collective response of fish to predators. Using a spatially-explicit schooling model, we will investigate the optimal collective response at the transition between order and disorder, and individual-level evolutionary adaptation as a mechanisms for self-organization towards criticality. Finally, by combining experimental data from laboratory setting and field experiments with computational models, we will explore the criticality hypothesis in relation to so-called "startle cascades", which represent rapid escape responses propagating through fish schools, akin to the activity avalanches observed in neuronal systems.



PD Philipp Hövel takes care of the speaker.

You can participate online via TEAMS: <https://tinyurl.com/romanczuk1807>

Interested people are cordially invited.

Coffee and cookies are served at 4.00 p.m. in front of the Lecture Hall