



Self-organization in drylands: from pairwise plant interactions to ecosystem robustness

Dr. Ricardo Martínez-García

*Dynamics of Complex Living Systems
Center for Advanced Systems Understanding (CASUS)
Görlitz, Germany*



Drylands, covering 40% of Earth's land, are fragile ecosystems where water scarcity drives the formation of regular vegetation patterns extending over hundreds of kilometers. Because manipulative experiments are hard to perform at these large scales and we still lack datasets tracking pattern dynamics, most of what we know about vegetation self-organization comes from theoretical models based on Turing instabilities. These models suggest that self-organized patterns are key for drylands, making them more resistant to environmental change. In this talk, I will first show that patterns could, instead, be a signature of ecosystem fragility under more realistic modeling assumptions, such as spatial heterogeneities leading to non-reciprocal plant interactions. Motivated by this finding, I will discuss our recent progress in developing an alternative framework using a combination of individual-level models and coarse-grained theories validated with greenhouse experiments and remote-sensing data.

Wednesday, May 21st, 2025 at 2:15 pm

MPI-DS, Prandtl Lecture Hall and
Zoom Meeting ID: 959 2774 3389
Passcode: 651129, [direct link](#)



Max Planck Institute for Dynamics and Self-Organization
Complex Systems Theory
Prof. Viola Priesemann

Email: viola.priesemann@ds.mpg.de
Am Faßberg 17, 37077 Göttingen, Germany