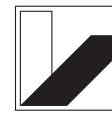


BayCEER Kolloquium

Lectures in Ecology and
Environmental Research

Summer 2022



UNIVERSITÄT
BAYREUTH

Donnerstag/Thursday

28.07.2022

12:15 in H8, GEO



Maximilian Pichler

Group of Theoretical Ecology, University of Regensburg

Machine Learning and Deep Learning - Opportunities and limitations for ecology

The popularity of Machine learning (ML) and Deep learning (DL) has sharply increased in recent years. In ecology and evolution (E&E), ML and DL are used to process images and other complex data (e.g. for automatic species identification) or to build predictive models for conservation, biodiversity assessment, and risk estimation. However, despite their recent rise in popularity, the inner workings of ML and DL models are often perceived as opaque. For example, is it still true that ML and DL are good tools for predictions, but statistics remains the choice when it comes to (causal) inference? Here, I provide an overview of the principles of ML and DL, how these tools differ from traditional statistical tools, and what that means when applying ML. I then discuss why and when ML and DL models excel, and where traditional statistical methods are preferable, highlighting current and emerging applications for ecological problems. Finally, I summarize emerging trends, particularly scientific and causal ML, that could significantly impact ecological data analysis in the future.

