

Einladung zum Pflanzenwissenschaftlichen Kolloquium

Freitag, den 4. Juli 2025, 12 c.t.

Nussallee 9, Hörsaal X

Referent: Dr. Tobias Jores

*Institute of Synthetic Biology, MNF, CEPLAS-Cluster of Excellence on
Plant Sciences, Universität Düsseldorf*

Thema: „Learning the grammar of plant regulatory DNA“

Faced with accelerating climate change and rapid population growth, we need crops with higher yields and greater resilience to ensure food security. Crop genome engineering will likely play an important role in meeting future food needs and gene regulatory sequences are promising targets for this engineering. However, we currently lack a sufficient understanding of plant regulatory logic for targeted and predictable engineering of regulatory DNA in crops. To overcome this limitation, I have developed Plant STARR-seq, a massively parallel reporter assay that can measure the species- and condition-specific activity of many different types of cis-regulatory elements.

We have successfully applied Plant STARR-seq to characterize enhancers, core promoters, terminators, and insulators. We showed that Plant STARR-seq is sensitive enough to pinpoint regions linked to regulatory activity and define the underlying sequence motifs with single-nucleotide resolution. The massive scale and complexity of the data generated by Plant STARR-seq is ideally suited to train computational models to predict the regulatory activity of any DNA sequence. Using training data from Plant STARR-seq experiments, I have developed convolutional neural network models that can accurately predict the species- and condition-specific activity of core promoters, terminators, insulators, and enhancers. The knowledge and models obtained from Plant STARR-seq experiments could help accelerate crop improvement by enabling the targeted and predictable engineering of regulatory DNA.

Diskussionsleitung: Prof. Dr. Armin Djamei, INRES – Pflanzenpathologie, Universität Bonn

Zu diesem Vortrag und zu einer evtl. Nachsitzung sind Sie herzlich eingeladen