



CEPLAS is a joint initiative of Heinrich Heine University Düsseldorf (HHU), University of Cologne (UoC), Max Planck Institute for Plant Breeding Research Cologne (MPIPZ) and Forschungszentrum Jülich (FZJ), funded by the DFG.

## Research Area Coordinators

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Research Area B	<i>Prof. Dr. Peter Westhoff, HHU</i> <i>Prof. Dr. Martin Lercher, HHU</i>
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Research Area D	<i>Prof. Dr. Markus Pauly, HHU</i> <i>Prof. Dr. Karl-Erich Jaeger, HHU/FZJ</i>

Participating Institutions



**CEPLAS**  
Cluster of Excellence on Plant Sciences

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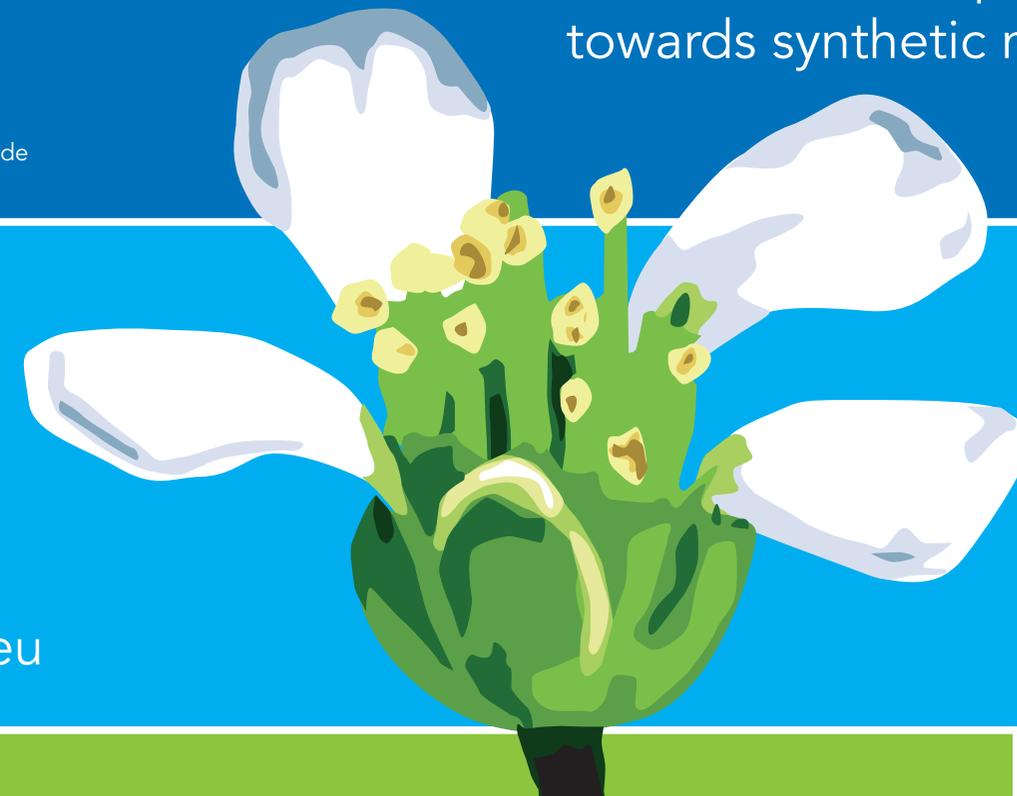
From complex traits  
towards synthetic modules

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## Vision of the Cluster

Arable land, water and nutrients become scarce, while the climate is changing and the world's population is further increasing. To ensure a sustainable supply with food, feed, and plant-based raw materials, innovative strategies for crop improvement are required.

The scientific vision of CEPLAS is to develop such strategies by understanding the molecular and genetic architecture of agronomically-relevant plant traits to the level that these traits can be designed as synthetic modules, which can then be transferred between species.

### Realising this vision will be achieved by

- integrating the research capacities of universities, Max Planck, and Helmholtz institutes within one plant science centre,
- forging and fostering national and international research alliances in the field of plant synthetic biology,
- development of novel training programmes for undergraduate and graduate students in quantitative and synthetic biology, and
- rethinking the training of postdoctoral researchers at the interface between academic and industrial careers.



## CEPLAS Research Strategy

The research strategy of CEPLAS – from complex traits towards synthetic modules – builds on comparative evolutionary genomic analyses of complex traits in a phylogenetic framework.

The ultimate goal of CEPLAS is to support the development of crop plants with improved yield potential and yield stability in a sustainable agriculture that protects natural resources.

CEPLAS scientists investigate the mechanistic basis and genetic architecture of four complex biological processes that have a crucial impact on the yield potential of crop plants and their adaptation to limited resources and, therefore, are of outstanding importance in designing and breeding the crops of the future:

- [A] Annual and perennial life histories
- [B] Photosynthetic carbon conversion efficiency
- [C] Composition and function of the plant microbiome
- [D] Metabolic interactions between plants and microbes



## Promotion of Young Scientists

Besides cutting edge science CEPLAS focuses on the promotion of early career researchers from the undergraduate to the postdoctoral level. An important aim of CEPLAS is to prepare young scientists for successful careers within and outside academia.

### Bachelor Programme in Quantitative Biology

... is an innovative 4-year study programme with focus on mathematics, biostatistics, bioinformatics and modelling, in addition to biology. Currently the bachelor programme is offered only on German.

### CEPLAS Graduate School

... offers a structured, 3-year programme with a focus on plant molecular biology, biochemistry, genetics, synthetic biology and computational biology. The programme is complemented by a training programme in scientific and transferable skills.

### CEPLAS Postdoc Programme

... is a 2-year structured programme that aims at providing our postdoctoral fellows with the best possible skills and expertise to allow them to achieve their personal career goals. Programme components are (scientific) training, mentoring, coaching and networking with industry.