



Matias Zurbriggen

Title:

Engineering photoreceptors into optogenetic tools for the control and understanding of cellular processes in microbial, animal and plant systems

Abstract:

Our synthetic biology research focuses on engineering bacterial and plant photoreceptors sensitive to different wavelengths of the white light spectrum (UV-B, blue, green, red/far-red) into synthetic photoswitches rewired to control molecular processes with high precision, quantitative and high spatio-temporal resolution, in a non-invasive way and with minimized toxicity. We implement these molecular tools into microbial, mammalian and plant cells, and *in vivo* in animals and plants for selectively manipulating signaling networks and metabolic pathways. The implementation of optogenetic tools in plants faces experimental constraints under normal growth conditions. Strategies to circumvent this will be discussed. This synthetic biology approach opens up unforeseen perspectives in fundamental and applied research, as exemplified hereby in the study of signalling pathways, including those involving plant photoreceptors, and crop design.

Biography:

Matias Zurbriggen did his undergraduate studies in Biotechnology at the University of Rosario and IBR, Argentina followed by a joint PhD work on plant biotechnology together with the Institute of Plant Genetics and Crop Research Leibniz-IPK, Gatersleben, Germany, graduating in 2009. After two years of postdoctoral work between the IBR, IPK and John Innes Centre, Norwich, UK, he moved to the University of Freiburg and BIOSO as an Alexander von Humboldt Foundation Fellow to work on mammalian synthetic biology and optogenetics. He was appointed Assistant Professor and started his group working on mammalian and plant synthetic biology in 2012. He was awarded a full Professorship in Synthetic Biology at the University of Düsseldorf and the Cluster of Excellence on Plant Sciences (CEPLAS) in 2015. He is a member of the steering board of the Study Group Systems and Synthetic Biology of DECHEMA and co-founder member of the Study Group Synthetic Biology at the German Society of Biochemistry and Molecular Biology (GBM). He is coordinator of the Research Area Synthetic and Reconstruction Biology at CEPLAS, and organizes conferences and symposia on synthetic biology and optogenetics.