

"Regenerative landscape of intestinal organoids"

Abstract: Development of intestinal organoids from single intestinal stem cells recapitulates the regenerative capacity of the intestinal epithelium. To unravel molecular mechanisms orchestrating organoid formation and regeneration of intestinal tissue, we follow organoids with single cell tracking through their full development with custom built light-sheet microscopes and delineate the mechanisms underlying their self-organization and symmetry breaking. We then will present the morphogenesis of crypt formation while single cells acquire their identity. Our findings reveal how single cells exposed to a uniform growth-promoting environment have the intrinsic ability to generate emergent, self-organized behavior resulting in the formation of complex multicellular asymmetric structures.



Prisca Liberali has been trained as physical organic chemist with a focus on physical organic chemical reactions. During her postdoc, she developed new experimental single-cell methods and statistical approaches to analyse and model cell-to-cell variability and its involvement in the emergence of complex cellular populations. Currently, she is an assistant professor at the University of Basel and at the Friedrich Miescher Institute for Biomedical Research (FMI) with a laboratory focused on dynamics of self-organization and on how cellular signalling dictates its spatial-temporal regulation. To address this in a fully tractable experimental model system that mimics conditions of tissue formation in organisms, her laboratory uses stem cells derived organoids and gastruloids. As these emergent systems have multiple layers of biological organization at different scales, her laboratory is developing novel image-based experimental, and statistical methods to increase our integrated understanding of single-cell biology. Prisca Liberali has received several research awards, including an ERC Starting Grant (2018-2022) and a SNSF Professorship Grant (2015-2021).