

Welcome Home Workshop 2014

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TITOLO: Engineered multicellular pattern formation in a population of unicellular eukaryotes

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Abstract

The organization of cells into multicellular structures allows single-celled organisms to develop a range of functions and architectural complexity that would be impossible otherwise. In most organisms, this ability is the key mechanism for the growth of tissues of different structures and functions. Understanding the principles behind multicellular organization will mark a quantum leap in the nascent fields of tissue and organ engineering, which may have an enormous impact on modern medicine and biophysics.

The primary aim of this project is to understand the mechanisms responsible for multicellular self-organization, one of the key challenges of developmental biology. Rather than investigating a system that naturally exhibits spatially differentiated patterns, we will develop a model from a unicellular organism, the yeast *S. cerevisiae*. Our goal is to integrate engineered gene regulatory components with natural and synthetic cell-cell communication modules to create yeast strains capable of supporting activator-inhibitor patterns.