



THE UNIVERSITY OF ARIZONA
COLLEGE OF ENGINEERING

Biomedical Engineering

DEPARTMENT OF BIOMEDICAL ENGINEERING SEMINAR SERIES

PRESENTS

Ingmar Riedel-Kruse, PhD

Associate Professor, Department of Molecular and Cellular Biology
University of Arizona

“Multi-Cell Systems: Synthetic Adhesion, Self-assembly, and Optical Control”

BIO: Ingmar H. Riedel-Kruse is an Associate Professor in the Department of Molecular and Cellular Biology at the University of Arizona. His research seeks to make it easier to engineer and program multicellular biological systems, circuits and devices in order to foster the human condition. He runs an interdisciplinary lab integrating diverse areas like synthetic biology, biophysics, human-computer interaction design, and embedded cyber-physical systems. He received his Diploma in theoretical solid-state physics at the Technical University Dresden, did his PhD in experimental biophysics at the Max Planck Institute of Molecular Cell Biology and Genetics, followed by a postdoc at the California Institute of Technology. He was then an Assistant Professor for Bioengineering and Biophysics at Stanford University before joining the University of Arizona.

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ABSTRACT: Multi-cellularity enables organisms and symbiotic systems to achieve complex tasks through collective emergent phenomena and division of labor among cells. My lab utilizes synthetic biology, systems biology, and biophysics approaches to facilitate the engineering and understanding of such multi-cell assemblies. I will demonstrate an orthogonal library of genetically encoded heterophilic cell-cell adhesion pairs that enables the self-assembly and patterning of bacterial aggregates at the 5 μm scale [Glass Cell'18], furthermore the optogenetic control of homophilic cell-cell adhesion that enables the programming of biofilm patterns onto surfaces at the 25 μm scale ('Biofilm Lithography') [Jin PNAS'18]. Furthermore, I will demonstrate how we can use interactive, multimodal light-stimuli to control and program the behavior of microswimmers, [Tsang Nature Physics'18]. Overall, our work aims at transformative ability to engineer and control multi-cellular bacterial assemblies, which promises new biomedical applications (modular drug biosynthesis, micro-robotics, self-healing materials, new infection treatment strategies) as well as application in other areas (e.g., for bioremediation or as basic research tools to understand microecology and evolution).

Please join us on

Monday, September 23rd, 2019

12:00-12:50 pm, Keating Bldg., Room 103

Refreshments will be available at 11:50 am

Hosts: Drs. DK Kang and Minkyu Kim

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