



**Systems Biology
Seminar Talk**

**Systems Biology of
TGF-beta Signaling:
from Analysis
to Control**

Prof. Dr. Zhike Zi



**15.02.2024
16:00 CET**

**Lecture Hall 0.106
Allmandring 31
Stuttgart**

Abstract:

Cells rely on intricate signaling pathways to perceive and respond to their surroundings. Among these, the transforming growth factor- β (TGF- β) pathway stands out as a critical regulator of many cellular processes, capable of generating context-specific responses. Although the main components of the TGF-beta signaling network have been extensively studied, it remains challenging to predict TGF- β signaling responses across different cell types and in single cells. In this seminar, I will demonstrate how the integration of mathematical models with quantitative experimental data facilitates the prediction of TGF- β pathway dynamics. Furthermore, I will present our recent work on exploring the principles governing heterogeneous TGF- β signaling responses through the implementation of a synthetic, optogenetically controlled TGF- β signaling system.

CV:

Dr. Zi studied Biology at Tsinghua University in Beijing before performing his PhD under the supervision of Prof. Edda Klipp at Humboldt University of Berlin, where he worked on kinetic modeling of cell signaling networks. He completed his PhD in 2008 and spent another year in Edda Klipp's group. Then, he started an independent postdoc position as a project leader at BIOS Centre for Biological Signalling Studies at University of Freiburg in 2009. In 2014, Dr. Zi established an independent research group at Max Planck Institute for Molecular Genetics. In 2022, he joined the faculty at Shenzhen Institute of Advanced Technology (SIAT), an institute under the Chinese Academy of Sciences, similar to the Max Planck Institute in Germany. His lab uses systems and synthetic biology approaches to study the molecular mechanisms by which cell systems dynamics regulate cell fate decisions.