

## ICB PhD public presentations

# BIOMOLECULAR CONDENSATION FOR BIOCATALYTIC REACTION ENGINEERING

### Andreas Küffner

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Supervisor: Prof. Dr. Paolo Arosio

Co-examiner: Prof. Dr. Donald Hilvert

**14/10/2021, 10 am, HIT E 51 (Siemens Auditorium)  
and on Zoom (ID: 663 7012 1428, PW: qwertz)**



**Project Summary:** Membraneless organelles have gained increased attention in the last years as in vivo reactors with distinct metabolic functions. These intracellular organelles are formed via liquid-liquid phase transition of proteins and nucleic acids. This process is often regulated by intrinsically disordered peptide (IDPs) sequences. These observations inspired us to exploit these IDPs to mimic membraneless compartments on the bench, towards the development of high-performance microreactors. We have demonstrated that by conjugating soluble enzymes with biologically inspired IDPs we can regulate not only the dynamic process of phase separation but also the properties of the resulting compartments. With this control we can, in turn, regulate biochemical reactions occurring within these condensates. Specifically, we have shown that compartmentalization can accelerate enzymatic reactions and inhibit aggregation events. We envision that this platform could find applications both in the industrial context and as model system to study the effect of biocondensates on cellular metabolism.

**CV:** Andreas joined ETH in 2011 for a BSc in Chemistry. Subsequently, he did a BSc in Chemical Engineering at ETH. Afterwards, Andreas did a MSc in Chemical and Bioengineering at ETH during which he did an internship at Merck Serono SA, Vevey. After his master's thesis in the group of Prof. Dr. Arosio he joined the group to conduct his doctoral studies.