

## ICB PhD public presentations

# QUANTITATIVE MILLISECOND KINETICS IN MICRODROPLETS USING NOVEL DETECTION METHODS

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**HCI H 2.1, 10.00 h**



**Project Summary:** The study of single-turnover and pre-steady-state enzyme kinetics often helps to unravel mechanistic details of reaction pathways and can provide access to reaction rates otherwise difficult to determine. However, measuring such reactions which typically occur on the millisecond timescale requires special techniques. We developed and characterized a novel droplet based microfluidic platform, capable of rapidly mixing the reactants followed by the detection of the reaction products using stroboscopic epifluorescence imaging. After validating the usefulness of the system using a range of commercially available assays we conducted a series of thermodynamic single turnover experiments involving the wild-type dehalogenase LinB and two engineered mutants. Finally, differential detection photothermal spectroscopy was introduced as a powerful tool to measure analyte concentrations in picoliter and femtoliter droplets and was successfully used to perform enzymatic and biological assays on chip.

**CV.** David received his BSc and MSc in Interdisciplinary Science from ETH Zurich in 2013 and 2014. Shortly after, he started his doctoral studies in the deMello group.