

**ICB PhD public presentations****HIGH-THROUGHPUT DROPLET  
SORTING FOR ENZYME  
ENGINEERING****Ankit Jain**

ICB / deMello group

Supervisor: Prof. Dr. Andrew deMello

Co-examiners: Prof. Dr. André R. Studart and  
Dr. Stavros Stavrakis**15/02/2023, 10.00 am, HCI D4 and on Zoom**  
(<https://ethz.zoom.us/j/61470086866>)

**Project Summary:** Traditional library screening methods are insufficient for screening large variant libraries in various directed evolution campaigns. Droplet-based microfluidic devices generate, process, and sort picoliter droplets at kilohertz rates, making them a powerful screening platform. However, their reliance on inline fluorescence detection either restricts their use to a limited number of natural substrates and enzyme classes or involves the use of surrogate substrates, which biases the enzyme optimization process. Herein, we develop novel enzyme screening assays and implement existing assays on droplet-based microfluidic platforms, eliminating the need for surrogate substrates from certain enzyme classes. Additionally, we present a novel droplet absorbance detection and sorting platform for screening natural substrates, expanding the droplet-based microfluidic toolset.

**CV.** Ankit received his B.Tech. in electronics and communication from IIIT Allahabad, India. Afterwards, he worked in the industry as a hardware engineer for two years. He received his M.Sc. in micro and nanosystem from ETH Zurich in 2017. During this time, he started working in Prof. deMello's group in D-CHAB. In 2018, he started his PhD in developing optofluidic platforms for the directed evolution of enzymes.