

ICB PhD public presentations**DROPLET-BASED MICROFLUIDIC PLATFORMS FOR IN-SITU OPTICAL MONITORING OF FAST REACTIONS****Julie Probst**

ICB / deMello group

Supervisor: Prof. Dr. Andrew deMello

Co-examiners: Prof. Dr. Chih-Jen Shih and
Dr. Stavros Stavrakis**23/11/2021, 2.30 pm, HCI D 8 and on Zoom
(Meeting ID: 661 1307 2806)**

Project Summary: Droplet-based microfluidic platforms have become powerful tools in high-throughput chemical and biological experimentation. In this work, we developed several platforms to expand the optical detection toolbox of droplet-based microfluidics and applied them for the in-situ monitoring of fast reactions on millisecond timescales. We first developed a detection scheme for the extraction of broad-band absorbance spectra from picoliter-volume droplets with high sensitivity and leveraged this platform to monitor the salt-induced aggregation of gold nanoparticles. Furthermore, we reported for the first time the integration of droplet-based microfluidics with X-ray absorption spectroscopy and used our approach to gain insights into the kinetics of amorphous calcium carbonate formation. In a third platform, we demonstrated the optical monitoring of lead halide perovskite nanocrystals formation on millisecond time-scales, by combining in-situ photoluminescence and fluorescence lifetime measurements. Finally, we also described the development of a double-emulsion microfluidic system for the generation of polymeric liquid-core upconversion microcapsules.

CV. Julie obtained a BSc. with honours in Chemistry and Chemical Engineering from EPFL in 2015, having spent one year on a scholarship as an exchange student at Imperial College London. Afterwards she obtained her MSc. in Molecular and Biological Chemistry at EPFL and graduated in 2017 with a master thesis in Prof. Hatice Altug's group. She began her PhD studies in September 2017 at the Institute of Chemical and Bioengineering under the supervision of Prof. Andrew deMello.