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ICB PhD public presentations

TEMPERATURE-CONTROLLED MICROFLUIDICS TO STUDY THERMODYNAMICS AND KINETICS OF BIOMOLECULAR SELF-ASSEMBLY

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Co-examiners: Prof. Dr. Paolo Arosio and Dr. Stavros Stavrakis

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Project Summary: Biomolecular phase transitions, such as liquid-liquid phase separation and aggregation, are important in a wide variety of fields, like cell organization, neurodegeneration and the design of new materials for bioseparation and catalysis. Therefore, understanding the mechanisms that govern these processes is important in biology, medicine, pharmaceutical and chemical technology. New tools based on microfluidic technology have huge potential to improve the analysis of these systems. In this work, we developed new methods that integrate droplet-based microfluidics with label-free detection techniques and external components that allow an accurate control of temperature on chip. We show the potential of these devices in increasing our molecular understanding of different biomolecular processes: i) the kinetics of rapid biomolecular events occurring on a time scale of milliseconds and seconds, including amyloid elongation and enzymatic reactions; ii) thermodynamic and kinetic aspects of phase separation of polymers and proteins.

CV. Alessia obtained a BSc with honours in Chemical and Food Engineering from Polytechnic University of Turin (Italy) in 2015. Afterwards, she did her MSc in Chemical and Bioengineering from ETH Zurich, where she was awarded the ETH Excellence Scholarship by the ETH Foundation. She graduated in 2017 with a Master thesis in Prof. Paolo Arosio's group. She began her PhD studies in September 2017 at the Institute of Chemical and Bioengineering under the supervision of Prof. Andrew deMello and Prof. Paolo Arosio.