ETH zürich

ICB seminar series 2015/16
chairman: Prof. Dr. Rudi Gunawan

RHEO-ENGINEERED MODULAR MICROFLUIDICS

Prof. Dr. Pier Luca Maffettone
Department of Chemical, Materials and Production Engineering, University of Naples Federico II

ETH Hönggerberg, 06/04/2016
HCI J 7, 17.00 h
The Seminar will be followed by an Apéro

Abstract. Manipulation of particles suspended in fluids flowing in microfluidic channels is required in a variety of biological, diagnostic and therapeutic applications. For instance, alignment of particles into a tight stream is a necessary step for their counting, detecting, and sorting. This task is usually carried out by using a Newtonian fluid as suspending medium and by properly fabricating a device with a complex geometry aimed at displacing particle trajectories. In the recent years, my group has exploited the rheological complexity of the suspending liquid as a key ingredient to develop microfluidic applications. Elastic stress components can, in fact, promote particle crossflow migration, which in turn can be used to manipulate the trajectories of suspended particles in devices with very simple geometries. Rheological properties of the suspending liquid and mechanical properties of the suspended particles play then a crucial role in such rheo-engineered microfluidics. In this talk, I will review our recent works on model-assisted design of microfluidics applications together with their experimental realizations.

Speaker highlights. Pier Luca Maffettone graduated from the Chemical Engineering Department of the University of Naples Federico II and received his Ph.D from the same University in 1993, where he stayed two more years as a post-doc researcher. After research visits at Stanford University and at the University of Delaware, he became Assistant Professor at the University of Naples Federico II in 1994. Four years later he changed to the Politecnico di Torino as an Associate Professor. In 2005 Pier Luca Maffettone returned to the University of Naples Federico II as Full Professor at the Department of Chemical, Materials and Production Engineering, where he is head of the department since 2013. He is a member at large of the Executive Committee of the European Society of Rheology and member of the editorial board of “Rheological Acta”.

ICB Institute for Chemical and Bioengineering

DCHAB Department of Chemistry and Applied Biosciences