H2020 MSCA - ITN - 2017 - 766007

Magnetics and Microhydrodynamics, from guided transport to delivery

ESR 11 Miniaturisation: towards 1 µm frictionless microfluidic channels

Research project	For a channel diameter *d*, the pressure drop Δp scales as $1/d^4$, making it very difficult to pump liquids through ultra-small channels, thus limiting standard pressure-driven microfluidics to channels several tens of microns wide at least. An even greater challenge facing the adoption of nanofluidics beyond the laboratory is the lack of high-throughput, cost-effective nanofabrication techniques with reliable device-to-device reproducibility. Magnetic force densities, on the contrary, scale as *d*, making magneto-microfluidic concepts advantageous. Our aim here is to explore methods of miniaturizing magnetically-confined liquid-in-liquid tubes, and study their micro-hydrodynamics at ever-decreasing length-scales. We will therefore take advantage of the knowledge of magnetic force creation and control developed by other partners, interface our devices with larger-scale microfluidics input-outputs (developed by microfluidics specialists), and aiming at making proof-of-principle microfluidic device component for mixing, cargo delivery and sorting with capabilities unreachable by current microfluidic techniques
Supervisors	Name: Bernard Doudin e-mail: bdoudin@unistra.fr website: http://www.ipcms.unistra.fr/?page_id=9413&lang=en Name: Thomas Hermans e-mail: hermans@unistra.fr website: www.hermanslab.com
Host Institutions	University of Strasbourg CNRS Université de Strasbourg Institute of Physics and Chemistry of Materials of Strasbourg 23 Rue du Loess 67034 Strasbourg France http://www.ipcms.unistra.fr/?lang=en Institut de Science et d'Ingénierie Supramoléculaires 8 allée Gaspard Monge, 67000 Strasbourg France http://isis.unistra.fr
Required profile	The candidate should hold a MS degree in Physics or Chemistry, with a strong background in Condensed Matter, Magnetism, or Physical Chemistry. Interest for interdisciplinary research is impoirtant. Research stays are planned at the Trinity College (Dublin, Ireland) and Universidad Del Pais Vasco (Spain). The candidate should **not have stayed in France in the past 12 months**.