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Droplet optofluidics as an application tool for biology and interface sciences

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Fluids in a controlled environment can perform operations that mimic the cellular and intra-cellular affairs. Such fluidic control at submicron scale is best provided by science of microfluidics where the platforms developed till date proved their significance in mimicking the organ structure. Often, manipulations of such tiny volumes of fluid are assisted by light and exploits their interaction to create "digital" micro-systems with highly significant scientific and technological interests in many areas such as single-cell studies, selected targeting, drug release and genetic sequencing. As greater aspect of technology design and application in biology, advancements of lab-on-chip technologies to artificially grow lung, heart and kidney models as well as insights on arteries and veins performance, that buildup those sophisticated organs had presented the potential of this science for diagnostics and drug delivery. Recent trends in the vary science are to understand what happens at cellular level when those diagnosis are performed and then observing those tests in real time. Biomimetic membranes standout as a remarkable tool to perform those tests in live feed while being a fragile structure often perish before the test completion. To tackle this issue a prospect is to develop lab-on-chip microfluidics droplet interface bilayer platform for stable biomimetic membrane generation. Soft lithography as a hardware realization tool is employed not only to develop a microdroplet generation accessory but also to interact those microdroplets by a multilayered geometry. This stability concern leads to successful imaging of membrane characteristics and opening new dimensions for modern medicine.

Speaker Biography

Zain Hayat is currently pursuing PhD at the Ecole Normale Superieure Paris-Saclay, France. His research focuses on the design of new optofluidic systems for droplet content analysis. Currently he is developing a highly sensitive optofluidic platform to study the dynamics and electro-optical properties of droplets interfaces and droplet-interface-bilayers (DIBs).

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