

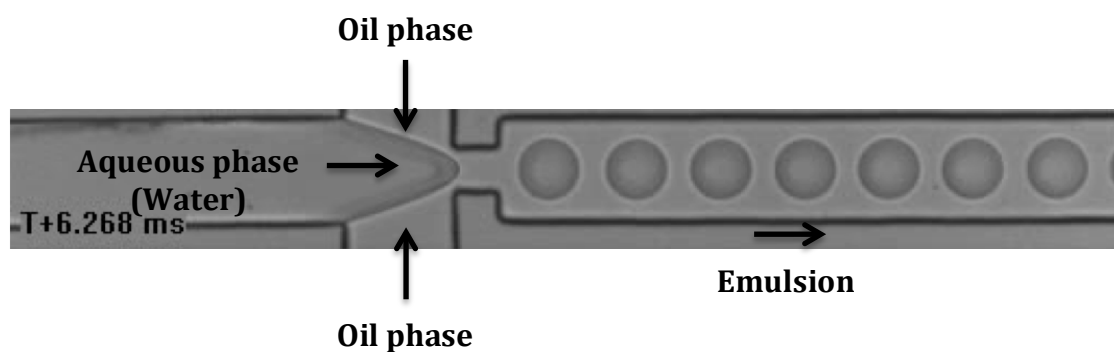
**Instructor: Michael Ryckelynck**  
**Capacity: 9 students maximum**

## **Droplet-based microfluidics applied to biological sciences**

Microfluidics has initiated a true revolution in biological sciences by increasing the throughput and the sensitivity of analytical methods while dropping their cost. These technologies have completely transformed the way of addressing biological questions. This is probably best exemplified by Next Generation Sequencing technologies.

Nowadays, a new set of breakthrough technologies (known as droplet-based microfluidics) emerges and is based on the use of water-in-oil droplets (Figure 1). These picoliter ( $10^{-12}$  L) compartments can be generated and individually handled in high throughput regimes (more than 1000 events per second). This makes possible, for example, to perform very high throughput screening of biological (or chemical) libraries for a few euros, with an unrivalled throughput and sensitivity.

This practical session will quickly introduce the technology through a short theoretical introduction of the main principles and capacities of droplet-based microfluidics followed by a hand-on session during which students will handle the microfluidic devices and perform a set of simple exercises.



**Figure 1.** Production of picoliter water-in-oil droplets. The arrows indicate the direction of the liquids. An aqueous phase is infused and pinched by two streams of oil and droplets of highly identical sizes are generated at rates of several thousands per second.