MICROFLUIDIC TECHNOLOGIES FOR DIAGNOSTIC APPLICATIONS

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Microfluidics is focused on the study and manipulation of fluids at the micrometer scale. The development of Lab-on-a-chips integrating various fluidic components in a single device has opened the way to numerous applications in the field of medical diagnostics and chemical detection. In particular, microfluidics has enabled the ability to perform analysis and detection of complex biological samples with single cell resolution and monitor the kinetics of chemical reactions at high throughput, while reducing analysis time and costs as well as reagent volumes.

We are working on the development of droplet based-microfluidics for the production and control of very small volumes (from pL to µL) using rapid prototyping tools such as 3D printing and soft lithography. In particular, we will present the implementation of a single-cell digital assay for the rapid detection of antimicrobial resistance biomarkers and antibiotic susceptibility testing in bacteria and the use of a droplet microfluidic strategy for the development of an enzymatic biosensor for a real-time, on-site detection of toxic compounds.