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# Droplet-based microfluidics for bottom-up synthetic biology

Jean-Christophe Baret\*<sup>†1</sup>

<sup>1</sup>CRPP CNRS UPR 8641 – Centre de Recherche Paul Pascal – 115 avenue Schweitzer 33600 Pessac, France

## Abstract

Droplet-based microfluidics offers new tools for the miniaturization and automatization of biochemical assays, for applications in diagnostics, next generation sequencing or high-throughput cell screening [1]. The fine control of the droplet manipulation in this format now also offers new means to create new types of microreactors. We use droplet-based microfluidics for the assembly, control and functionalisation of microreactors based on phase transitions in liquid-liquid systems, a system proposed a couple of decades ago by Fox and Oparin as prebiotic active systems [2,3]. Complex protocells are then assembled and functionalised based on sequential operations controlled by microfluidics. We foresee that this approach could lead in the future to microstructures of increasing complexity having properties mimicking (and maybe converging to) those of living systems.

Baret et al. Lab Chip 2009, Guo et al. Lab Chip, 2012

Fox et al. Science 1959

Oparin, Advances in Enzymology, 1965

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\*Speaker

<sup>†</sup>Corresponding author: jean-christophe.baret@u-bordeaux.fr