

## Geometrical Based Unequal Droplet Splitting Using Microfluidic Y-Junction

**Authors :** Bahram Talebjedi, Amirmohammad Sattari, Ahmed Zoher Sihorwala, Mina Hoorfar

**Abstract :** Among different droplet manipulations, controlled droplet-splitting is of great significance due to its ability to increase throughput and operational capability. Furthermore, unequal droplet-splitting can provide greater flexibility and a wider range of dilution factors. In this study, we developed two-dimensional, time-dependent complex fluid dynamics simulations to model droplet formation in a flow focusing device, followed by splitting in a Y-shaped junction with sub-channels of unequal widths. From the results obtained from the numerical study, we correlated the diameters of the droplets in the sub-channels to the Weber number, thereby demarcating the droplet splitting and non-splitting regimes.

**Keywords :** microfluidics, unequal droplet splitting, two phase flow, flow focusing device

**Conference Title :** ICLCT 2021 : International Conference on Lab-on-a-Chip Technologies

**Conference Location :** Istanbul, Türkiye

**Conference Dates :** April 26-27, 2021