

Seminar

Automated Dimensioning of Networked Labs-on-Chip

Two-phase flow microfluidics is a sophisticated and frequently applied Labs-on-Chip (LoC) technology as they allow to automatically conduct medical/biochemical experiments. In this technology, small volumes of reagents, so-called droplets, flow in an immiscible continuous flow inside closed channels making it particularly biocompatible. In the recent past, this technology was extended by a concept allowing to passively navigate droplets through the system—leading to so-called Networked Labs-on-Chips (NLoCs). After the design of an NLoC architecture which defines the comprising connectivity between components and, by this, how the considered medical/biochemical experiments are supposed to be realized, the question remains how to properly dimension the used components, i.e. especially how to dimension the used channels. However, this is a challenging task which is conducted manually thus far and frequently leads to specifications that do not work as intended. Our target paper addresses this issue by providing the designer with methods that allow to 1) automatically validate whether a chosen specification of an NLoC indeed works as intended and 2) automatically dimension NLoCs. Case studies demonstrate the importance and usefulness of the proposed methods for determining proper specifications of NLoCs.

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