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THE HYDRODYNAMIC FOCUSING OF LOW VISCOUS LIQUIDS AND WEAKLY ELASTIC POLYMER SOLUTIONS

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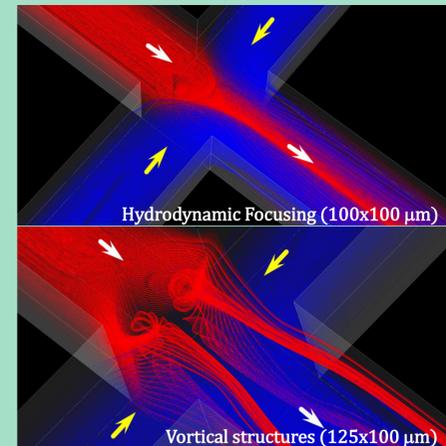
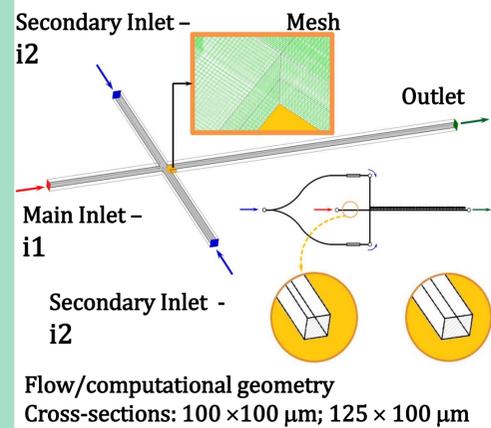
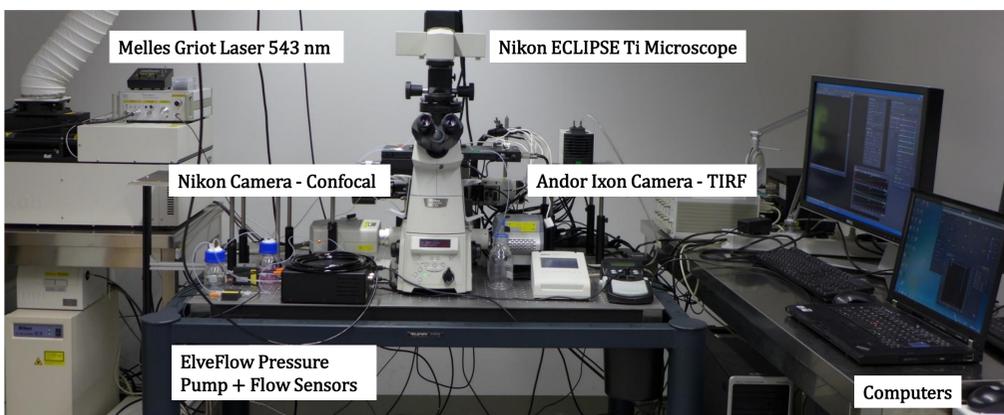


Hydrodynamic focusing is the confinement or redirection of a slower flowing stream by a faster flowing stream. The interface between the focusing and focused fluids depends on the Reynolds number Re and the device geometry.

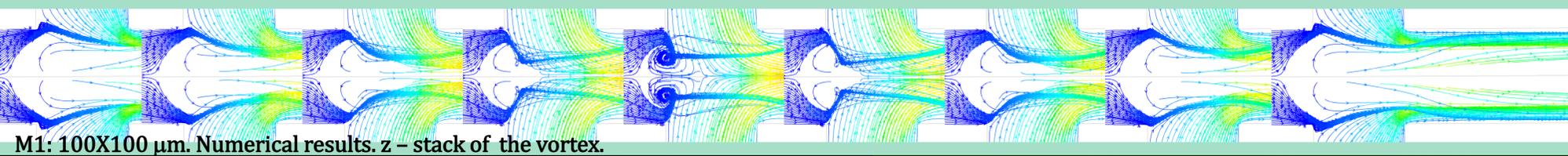
The present study investigated the hydrodynamic focusing phenomenon inside 2 cross-junction microchannels with rectangular cross-section of $100 \times 100 \mu\text{m}$ and $125 \times 100 \mu\text{m}$. The aim was to understand and characterize the shape of the **vortical structures** obtained from the focused stream, in the region of cross linked branches of the junction, depending on the microchannel geometry, flow parameters and fluid properties. Numerical simulations performed by FLUENT code were found consistent for the Newtonian flows.

Keywords: hydrodynamic focusing, vortical structures, CFD, microfluidics, rheological properties.

EXPERIMENTAL SETUP

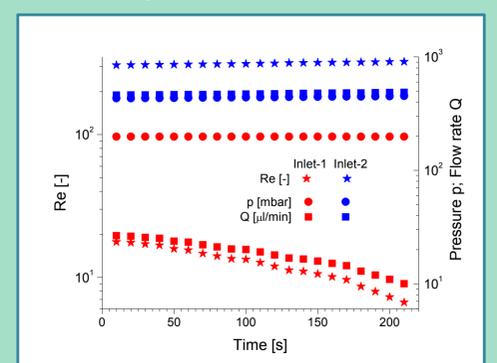
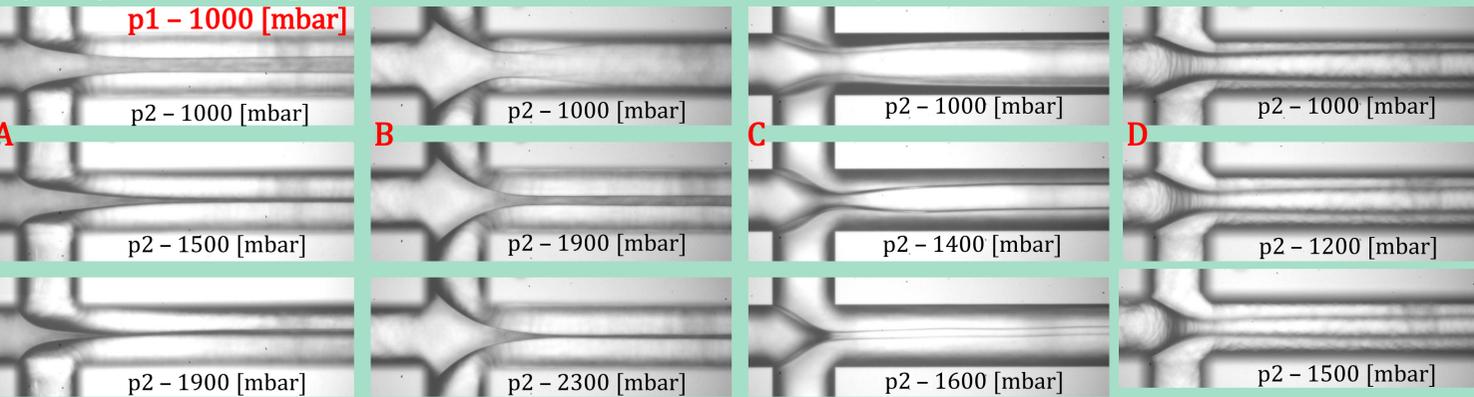


EXPERIMENTAL AND NUMERICAL RESULTS



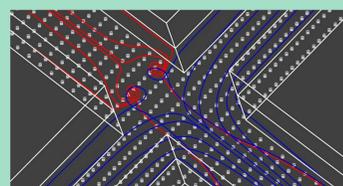
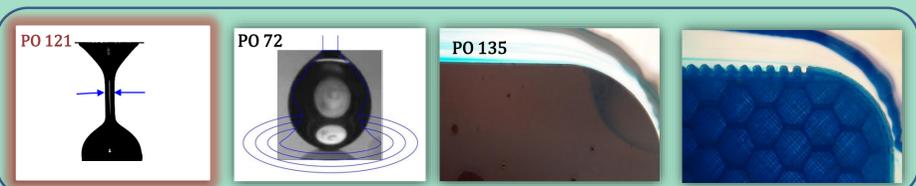
Hydrodynamic focusing. A) i1 - PAA, i2 - Oil. B) i1 - PAA, i2 - water. C) i1 - Oil, i2 - PAA. D) i1 - Oil, i2 - water.

Inlet Boundary conditions. i1, i2 - water.



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FUTURE WORK



The Influence of micropatterns on the flow dynamics

