

# Plasma Skimming through Branched Microchannel Using OpenFOAM

Sahil Deepak Kukian

Department of Aeronautical and Automobile Engineering  
Manipal Institute of Technology, Manipal, Karnataka, India

## Abstract

Blood Plasma extraction plays a big part in the medical industry as the need for fresh blood and also its plasma are always in huge demand. The plasma extracted can be used for various Plasma therapies and disease testing procedures. Due to conventional methods being difficult to transport, new Novel methods need to be developed for efficient extraction. One such method is the use of Branched Microchannels. Blood flowing through a micro Channel can be considered a Two-phase flow consisting of plasma and Red Blood Cells (RBC's). Branching the microchannel allows plasma to be extracted from the blood in a process called Plasma Skimming. This effect utilizes the Zweifach-Fung effect, also known as the Bifurcation Law. Some factors that effect this function are going to be studied using single phase "nonNewtonianIcoFoam" solver in OpenFOAM. Once verified we can then move onto a more complex Two-phase solver such as the "twoPhaseEulerFoam" to capture the plasma moving into the branch channel.

## References

1. K. Morimoto et al (2007) in the paper titled "Numerical estimation of plasma layer thickness in branched micro channel using a multi-Layer model of Blood Flow"
2. Yang Sung et al (2006) in the paper titled "A Microfluidic device for continuous, real time blood plasma separation"