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Characterization of Fluid Flow in Paper-Based Microfluidic Systems NOOSHEEN WALJI, BRENDAN MACDONALD, University of Ontario Institute of Technology — Paper-based microfluidic devices have been presented as a viable low-cost alternative with the versatility to accommodate many applications in disease diagnosis and environmental monitoring. Current microfluidic designs focus on the use of silicone and PDMS structures, and several models have been developed to describe these systems; however, the design process for paper-based devices is hindered by a lack of prediction capability. In this work we simplify the complex underlying physics of the capillary-driven flow mechanism in a porous medium and generate a practical numerical model capable of predicting the flow behaviour. We present our key insights regarding the properties that dictate the behaviour of fluid wicking in paper-based microfluidic devices. We compare the results from our model to experiments and discuss the application of our model to design of paper-based microfluidic devices for arsenic detection in drinking water in Bangladesh.

Brendan MacDonald
University of Ontario Institute of Technology

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