

Public Abstract

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Graduation Term:SS 2007

Department:Mechanical & Aerospace Engineering

Degree:PhD

Title:A DEVELOPMENT OF THE MOTILE SPERM SORTING MICROFLUIDIC DEVICES

The objectives of this research are developing and improving an inexpensive and convenient microfluidic device to apply to sperm cell sorting. Based on well known soft-lithography fabrication method which contains rapid prototyping and wet-etching, the polymeric microfluidic devices, mainly microchannels, are fabricated. The fabrication processes of microfluidic devices are completed without an expensive cleanroom facility.

To successfully design the microfluidic devices, we built mathematical flow models for single and multiple microchannels using fluid flow equations that govern the motion of the Newtonian liquid. These mathematical models are used to optimize the design of the microfluidic devices. The flows in the completed microfluidic system are observed using an inverted microscope and recorded by a digital camera. Experiments on fluid flow and on the movement of small particles including cells are conducted. These experiments lead to the development of a Motile sperm Sorting Microfluidic System (MSMS).