

Title: *Three Dimensional Micro-Fluidic Pumps and Valves (UMD 07-08)*

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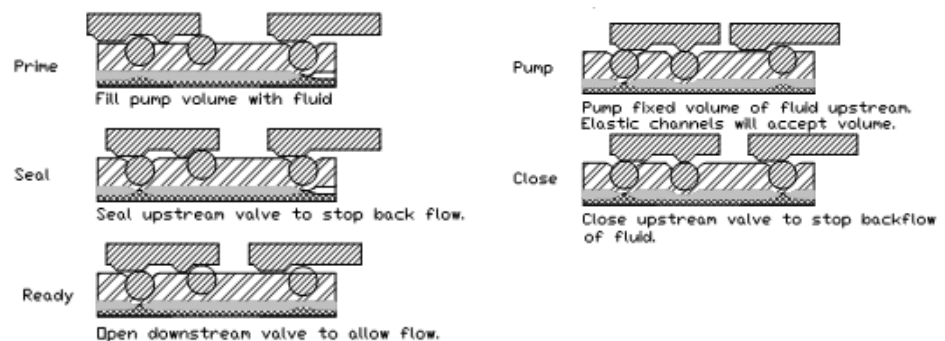
Applications: Improved micro-fluidic chips for use in lab-on-a-chip technologies, enzymatic assays, DNA analysis (e.g., polymerase chain reaction and high-throughput sequencing), and proteomic applications.

Benefits:

- Low-cost, easily customizable disposable microfluidic chips
- Increased reliability through simple design
- Reduced product development time
- Significant cost savings compared with silicon and other MEMS devices.
- Compatibility with the use of low-cost, off-the-shelf, easily processed materials

Technology Description: This invention provides a cost-effective, flexible and customizable technology that can allow the accurate movement, mixing and/or dispensing of micro-level quantities of liquids for lab-on-a-chip applications. The invention comprises the use of three dimensional micro-fluidic flow channel elements with mating control elements to control and move fluids in the channels. In particular the control elements are imbedded in an elastic cover material which provides the closure for the micro-fluidic circuits. In one embodiment, the control elements are rigid balls which are activated mechanically by a linear cam bar. The basic elements of the invention are an on/off control valve of simple mechanical design and a positive displacement mechanical pump. These two elements provide precise control of fluids for mixing, reacting and measurement in micro-fluidic devices. This technology solution could be packaged in a lab-on-chip or as a discrete component of an overall system.

Patent Status: [US Patent No. 8,096,786.](#)



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