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ABSTRACT OF THE INVENTION

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VALVELESS MICROPUMP

A valveless micropump includes a hollow pump chamber having a driving element coupled thereto, an inlet channel coupled to the hollow pump chamber, and an outlet channel coupled to the hollow pump chamber. The inlet channel, the hollow pump chamber, and the outlet channel define a fluid flow path through the inlet channel, the hollow pump chamber, and the outlet channel. At least one direction-sensitive element disposed in the flow path within one of the inlet and outlet channels and comprising a direction-sensitive element, is installed at an angle which produces a drag ratio greater than unity on fluid in the flow path. The driving element may comprise an electrostatic/piezoelectric member. Various embodiments of the valveless pump include one or more of the airfoil elements mounted in one, the other or both of the inlet and outlet channels, including embodiments in which one or more cascades of the airfoil elements are mounted in the inlet channel and the outlet channel.

Figures 1A and 1B