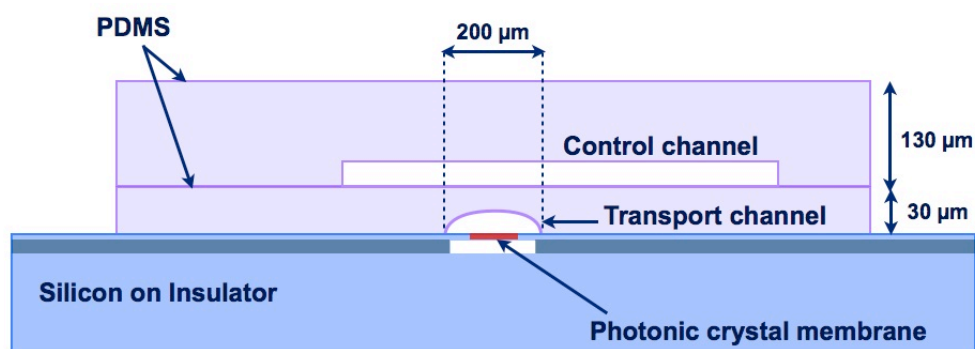


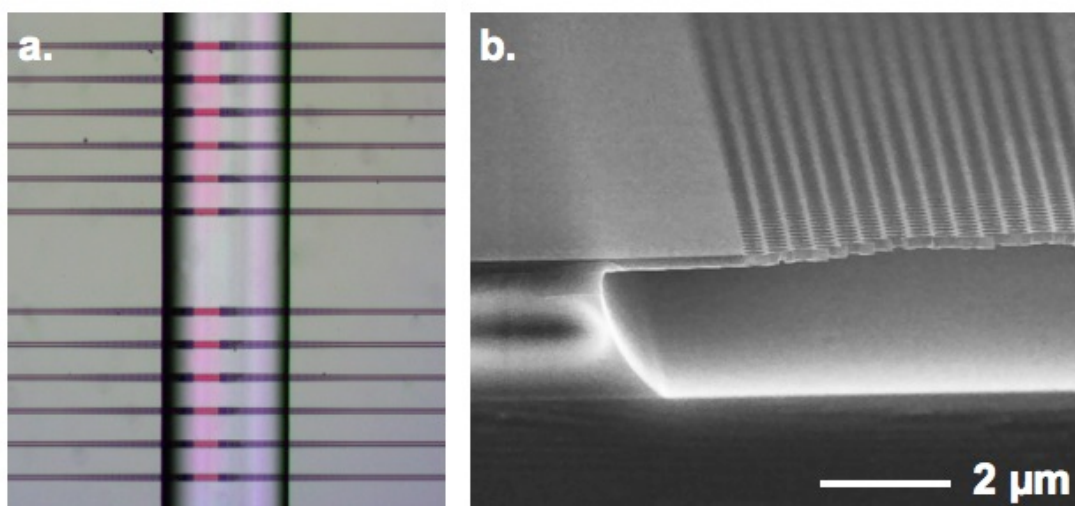
Electronic Supplementary Information

The optofluidic chip consists of two main parts: a silicon-on-insulator substrate comprising of the photonic crystal structures and a thin microfluidic membrane. Each part is fabricated separately before the final assembly is performed in a clean-room environment. Supplementary Figure 1 shows a cross section (not to scale) of the optofluidic chip. The PDMS microfluidic circuit is composed of a thin layer (30 μm) that includes a transport channel (12 μm high, 200 μm wide) and a thicker layer (160 μm) that includes a variety of control channels. The transport channel is rounded in shape in order to achieve complete closure of the Quake valves located at the input and output of the circuit. The assembly of the optofluidic chip is performed manually under binoculars. The accurate alignment of the transport channel and the photonic crystal devices is a critical step in the fabrication process.



Supplementary Figure 1 Schematic of the cross section of the optofluidic chip. A two-layers PDMS membrane including the transport and control channels is deposited on top of the SOI photonic crystal chip. The transport channel is manually aligned on top of the PhC devices.

Supplementary Figure 2.a shows an optical micrograph of the photonic crystal devices (in red) after deposition of the microfluidic circuit and alignment of the transport channel (dark edges to the left and right of the structures). The photonic crystal devices are fabricated using standard e-beam lithography and reactive ion etching on a silicon-on-insulator wafer. The silicon oxide layer underneath the photonic crystal structures is then removed by wet etching with hydrofluoric acid. The final structure consists of a 220 nm patterned and suspended silicon membrane as can be seen on Supplementary Figure 2.b.



Supplementary Figure 2. a) Optical micrograph of the photonic crystal structures (red) after they have been positioned underneath the 200 μm wide transport channel (vertical dark edges). b) Scanning electron micrograph of a photonic crystal membrane after the fabrication is complete. The patterned silicon membrane is suspended above a 2 μm high air gap.