

Supplemental information for:

Fully 3D printed Fluidic Devices with Integrated Valves and Pumps for Flow Injection Analysis

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Overview

1. Six STL files: 2 STL files per layer (with the 3 layers being a Flow Layer, Valve Layer, and Cover Layer), with one STL for the Agilus30 component and one for the VeroClear material.
2. Video (AVI file) of the peristaltic pumps in action
3. Video (AVI file) of the loading step (of the injection process)
4. 2 supplemental figures (Fig. S1 and S2)

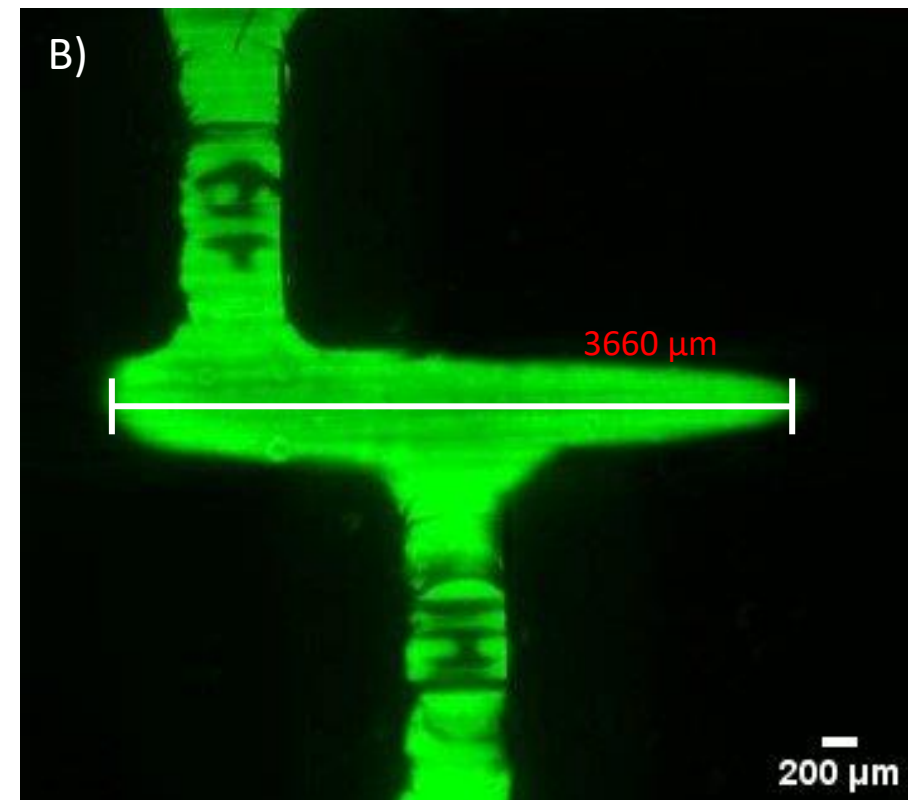
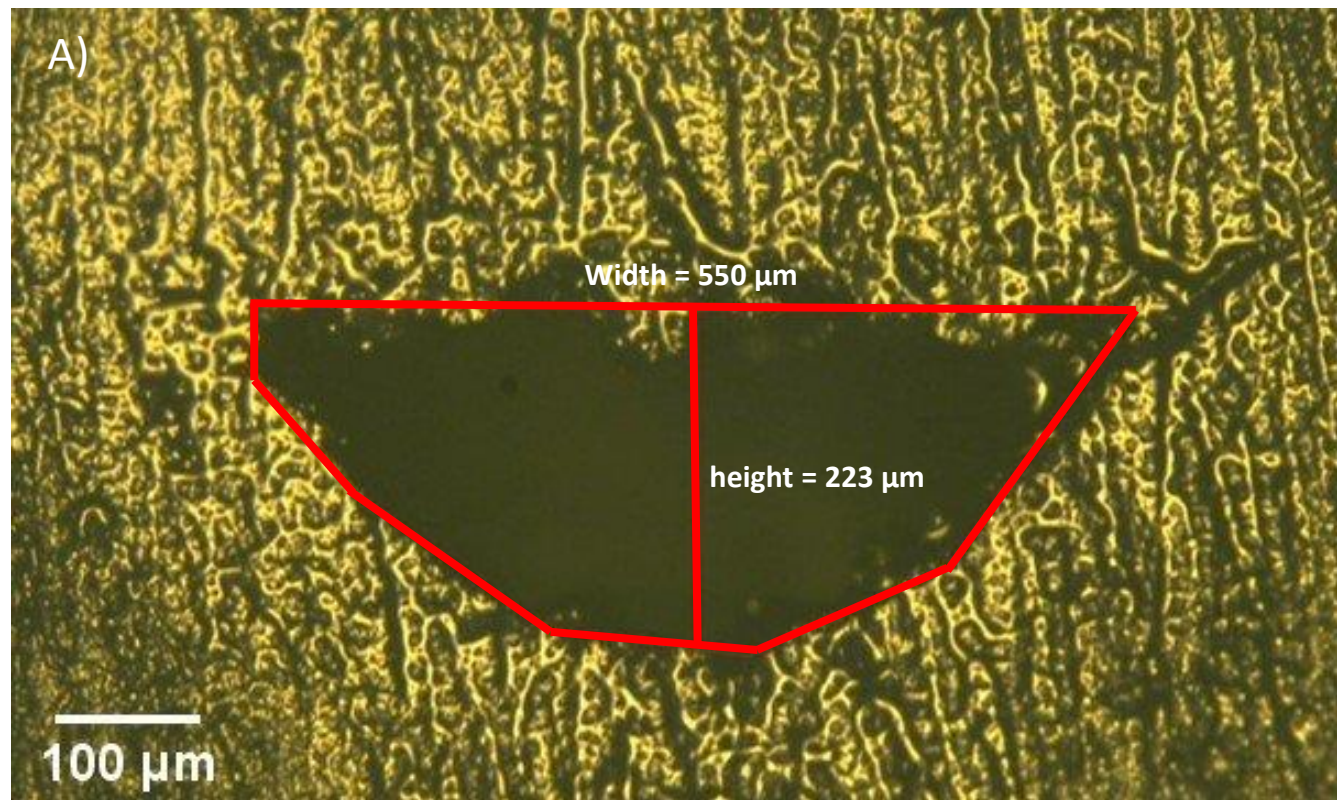


Figure S1. A) Bright field micrograph showing cross sectional area of analysis channel used in the devices. The micrograph was taken with a Keyence VHX-500K digital microscope (Japan) and the cross-section area measurement made with their VHX Measurement Software. The cross-sectional area was found to be $8.2 \times 10^{-4} \text{ cm}^2$. Considering the length of the injection plug shown in B) (3660 μm), the injection plug volume was calculated to be 300 nL .

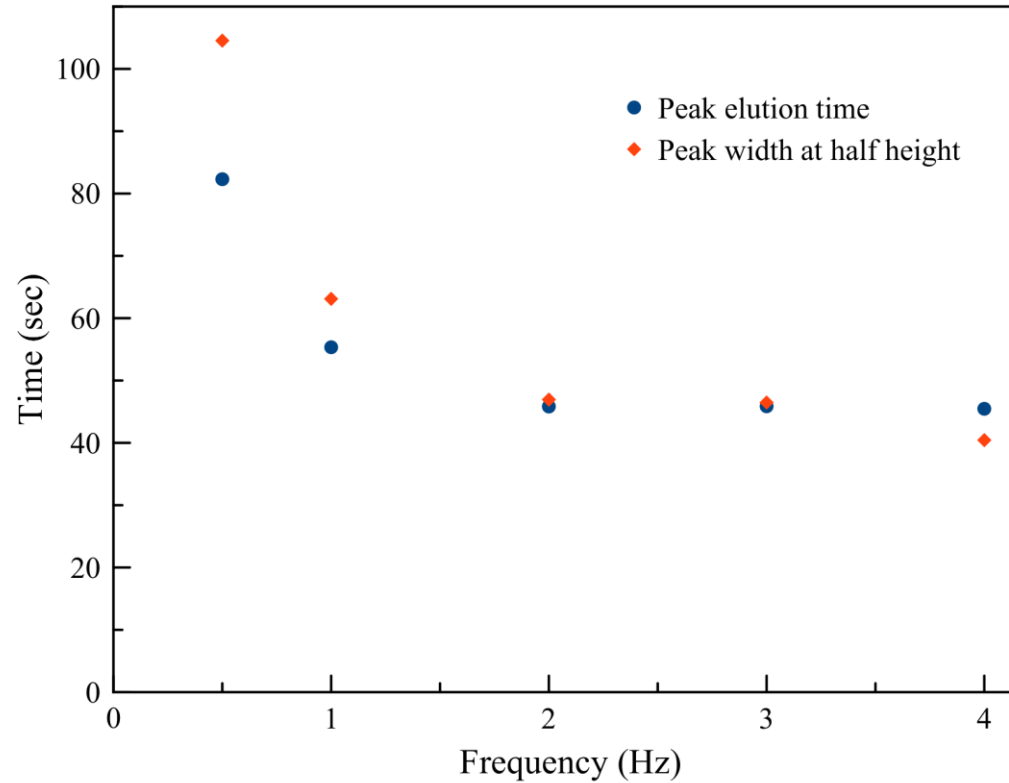


Figure S2. Plot of peak elution (using apex of peak) vs pump frequency as well as peak width at half-height vs pump frequency. As can be seen on the figure, as pump frequency increased from 0.5 to 2 Hz, the peaks eluted more quickly and were narrower. It was found in separate studies that at frequencies greater than 5 Hz, the plugs did not migrate down the channel (frequency was too high for pumping action). These studies utilized a pump frequency of 2 Hz but the range of 2-4 Hz are clearly suitable for pumping in devices of these dimensions.