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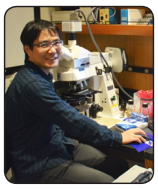
Abstract



# 3D printed glass: Novel microfluidic device fabrication using selective laser-induced etching

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**Abstract:**
Polydimethylsiloxane (PDMS) based micro-devices fabricated by photolithographic techniques and micromachined polymers (such as PMMA and COC) remain the standard in the field of microfluidics. Although these polymeric materials have numerous benefits such as the ability to rapidly prototype and a relatively low replication cost, they also have many drawbacks namely: PDMS's lack of rigidity, poor solvent resistance, high gas permeability, and 2D limited designs. To overcome these drawbacks, we utilize a cutting-edge microfabrication technique called selective laser-induced etching (SLE) to fabricate truly 3D monolithic structures within fused silica. SLE allows us to create transparent and chemically resistant microfluidic devices impossible with standard photolithographic or milling techniques. In this poster, we will present the techniques and technical challenges associated with SLE glass microfluidic device fabrication as well as results from recent experiments.

**Biography:**
Kazumi Toda-Peters completed a BS in Applied and Computational Mathematical Sciences from the University of Washington. He now works as the lead research technician specializing in microfabrication in the Micro/Bio/Nanofluidics Unit at the Okinawa Institute of Science and Technology.

**Publication of speakers:**

- 1. Haward, S. J., Kitajima, N., Toda-Peters, K., Takahashi, T., Shen, A. Flow of wormlike micellar solutions around microfluidic cylinder with high aaspect ratio and low blockage ratio, Soft Matter, 2019, 15, 1927-1941. DOI: 10.1039/C8SM02099J
- 2. Burshtein, N., Chan, S. T., Toda-Peters, K., Shen, A. Q., Haward, S. J. 3D-printed glass microfluidics for fluid dynamics and rheology, Current Optinion in Colloid & Interface Scince, 2019, 43, 1-14. ISSN 1359-0294, https://doi.org/10.1016/j.cocis.2018.12.005
- 3. Haward, S. J., Toda-Peters, K., Shen, A. Q. Steady viscoelastic flow around high-aspect-ratio, low-blockage-ratio microfluidic cylinders. Journal of Non-Newtonian Fluid Mechanics, 2018, 254, 23-35. https://doi.org/10.1016/j. jnnfm.2018.02.009

**Webinar on 3D Printing and Additive manufacturing; June 03, 2020; Paris, France. (No Link Given)**

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