

Master Thesis:

Multichannel chip-level optical coherence tomography with 3D printed optical components

Optical coherence tomography (OCT) looks back on great advances in the past decades. Its microscopic resolution in **volumetric imaging** opened a wide field of applications reaching from ophthalmology in medical diagnostics to **particle and defect characterization** in material sciences. Current systems are however bulky and expensive. To integrate OCT on a chip single-mode optical coupling is required. Using **3D-printing** of lenses at a chip facet we have already demonstrated a highly scalable and miniaturized OCT-chip.^[1] Based on our demonstration our goal is to establish a new generation of OCTs that are penetrating mass market.

Your tasks:

- Simulating freeform-micro lenses for OCT measurements
- Fabrication of optical components using a 3D-Printer
- Performing OCT measurements of different sample materials

The thesis is focused on realization of a novel instrument probe allowing for specific material analysis underneath its surface.

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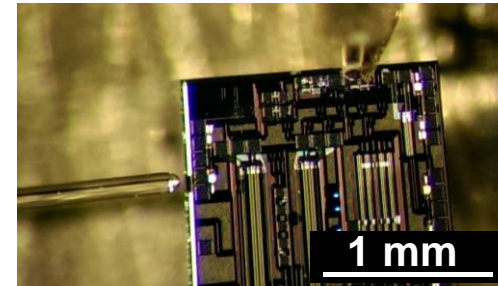


Fig. 1: OCT system integrated on silicon photonic chip.^[1]

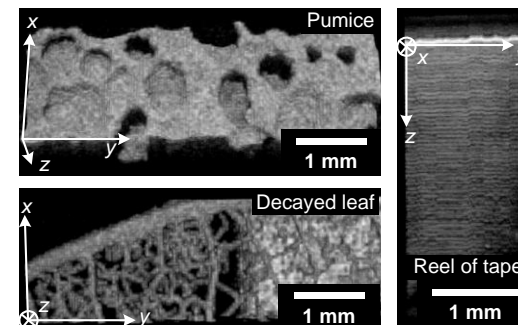


Fig. 2: Cross-sectional scans of different materials.^[1]

One cent coin to scale

[1] S. Schneider et al., CLEO, ATu2P.4, San Jose, CA, USA, 2014.