Bachelor/Master Thesis:

3D printing of micro-structures for high-speed optical communication

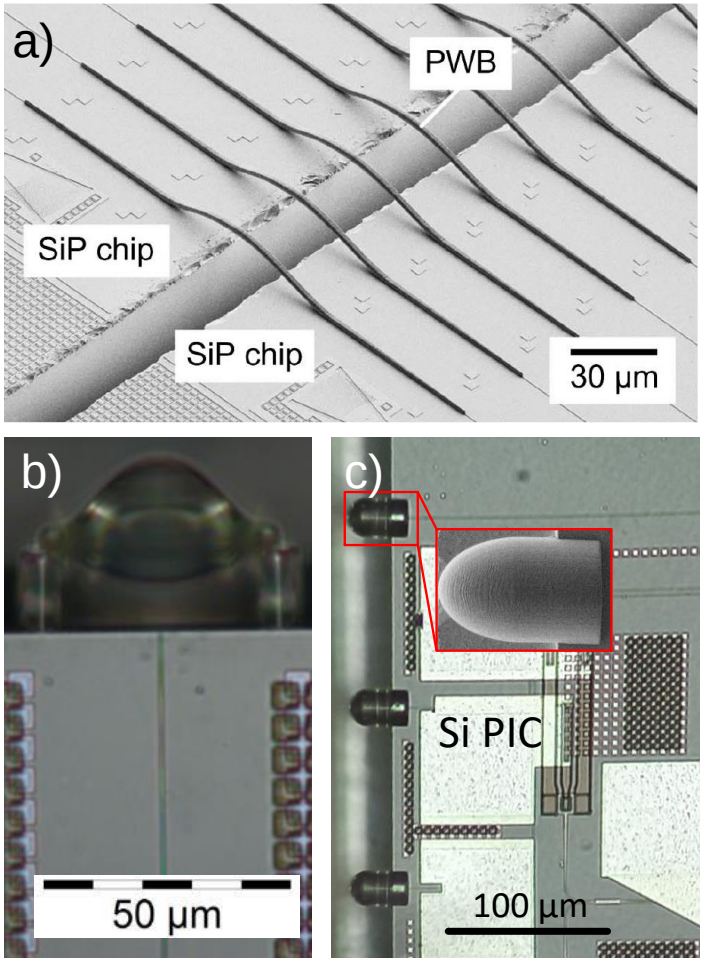
Karlsruhe Institute of Technology

We use **3D-printing** based on two-photon polymerization (TPP) to fabricate photonic-wirebonds (PWB), Fig. a), and free-form lenses, Fig. b) and c), that serve as optical interconnects for high-speed communication. The thesis aims at developing new processes and materials using highly reproducible interfaces such as chip-to-chip connections or fiber-to-fiber loops.

Your tasks:

- Test and optimize materials and processes for 3D-lithography.
- Fabrication photonic wirebonds on single-mode fibers or chips as a simple test interface for 3D-printing.
- Measure the surface quality, shape and performance of the fabricated structures with electron microscopy (SEM), atomic force microscopy (AFM), white-light vertical scanning interferometry (VSI) and coupling experiments.

The focus of this thesis is on experimental work. Some optical and mechanical simulation will be required. Starting: As soon as possible. Location: CN (IMT) and CS (IPQ).



a) Photonic wirebonds between two chips, M. R. Billah et al., *Optica* **5**, 876--883 (2018). b) A biconvex lens on a chip facet b) Several lenses on a chip facet.

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