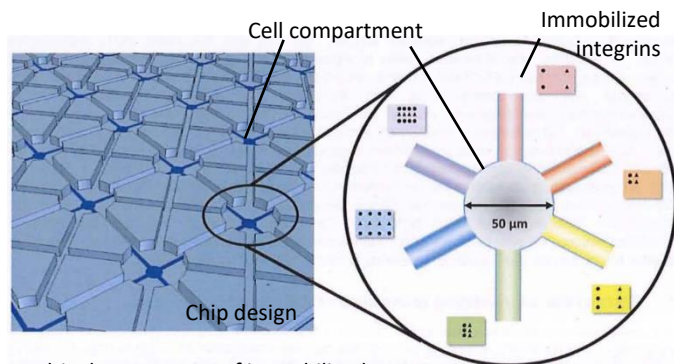
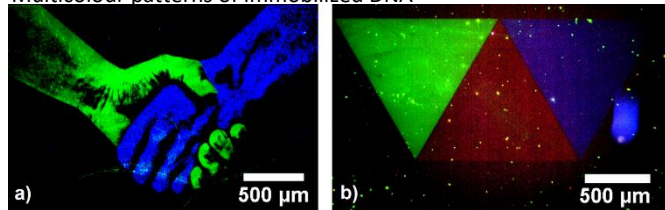


# $\mu$ -stereolithography of single-cell-chips and multi-ligand immobilization

Understanding cell behaviour is the key to healing or even preventing a multitude of diseases. Cells react to their environment using receptors/ligands on the cell membrane that bind to ligands/receptors presented on other cells or on the extracellular matrix. Integrins are a class of receptors that play a major role in cell adhesion. Cell adhesion is one of the first steps in many wanted processes such as wound healing and many unwanted processes such as tumour spreading. It has been previously proposed that the spacing of integrins may play a major role in cell spreading. This project aims at elucidating the influence of integrin subtype combination and spatial distribution on cell spreading. The project is a cooperation of IMTEK, the Karlsruhe Institute of Technology (KIT) and the Max Planck Institute Heidelberg (MPI-HD). Your task is to provide microfluidic chips of different materials with single-cell compartments and specialized 3D designs. The project also involves the immobilization of multiple ligands by the BioBitmaps technology (covalent surface attachment of ligands by photobleaching). In the course of this work you will:



Multicolour patterns of immobilized DNA



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- Fabricate single-cell chips by microstereolithography ( $\mu$ -STL) in different materials, coordinate the testing of these chips for evaluation of their cell culturing properties with cell-culturing lab at the Karlsruhe Institute of Technology (KIT) and/or Max Planck Institute Heidelberg (MPI-HD)
- Test and develop protocols for multi-component immobilization of biomolecules (e.g. DNA, proteins) on chip based on photobleaching technology “BioBitmaps”
- Use the knowledge gained from the multi-component immobilization experiments to immobilize specifically labelled DNA fragments on electrodes for the development of a DNA-hybridization sensor.

## Requirements

**Professional skills:** studies in chemistry, biochemistry or material science, well-grounded knowledge of chemical lab work (synthesis and analysis), knowledge of additive manufacturing techniques and photopolymerization.

**Personal skills:** You are interested in pursuing your own ideas and expanding your knowledge by extensive reading. You enjoy scientific discussions and you are eager to present and publish your results. You are communicative and have a strong organizational talent and you are willing to coordinate your work with external groups.

For further information please contact:

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