

## Neuron Sensor – Part II

### Microfluidic chip to guide neuronal outgrowth along an multielectrode array

#### Description

The goal of this study is to develop a **microfluidic chip** (MFC) to define the outgrowth of the neuronal network on a microelectrode array (MEA). The MFC is made of polydimethylsiloxane (**PDMS**) and separates two culture chambers with a volume of about 100  $\mu\text{l}$  culture medium by an array of microfluidic channels with a cross-sectional area of about 100  $\mu\text{m}^2$ . This allows the compartmentalized analysis of different subcellular neuronal compartments, e.g. soma, axons and synapses. For different cell sources, e.g. zebrafish vs. rodents, different channel geometries are required to allow full outgrowth of neuronal extensions. It would be ideal if the student had previous experience in micro- and nanofabrication. The MFC molds will be fabricated by **femtosecond laser**, **photolithography**, and **stereolithography** using the **two-photon polymerization** technique. The process will take place either in the clean room of IMT or PVZ.

#### Fields of activity

- Literature research of microfluidic chip fabrication.
- Fabrication of microfluidic chip in the clean room.
- Characterization of the fabricated microfluidic chip.
- Documentation of results.

#### Requirements

- Interested in microfabrication and/or relevant experience.

**Start:** By arrangement  
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