

Fluids and Space Engineering Seminar

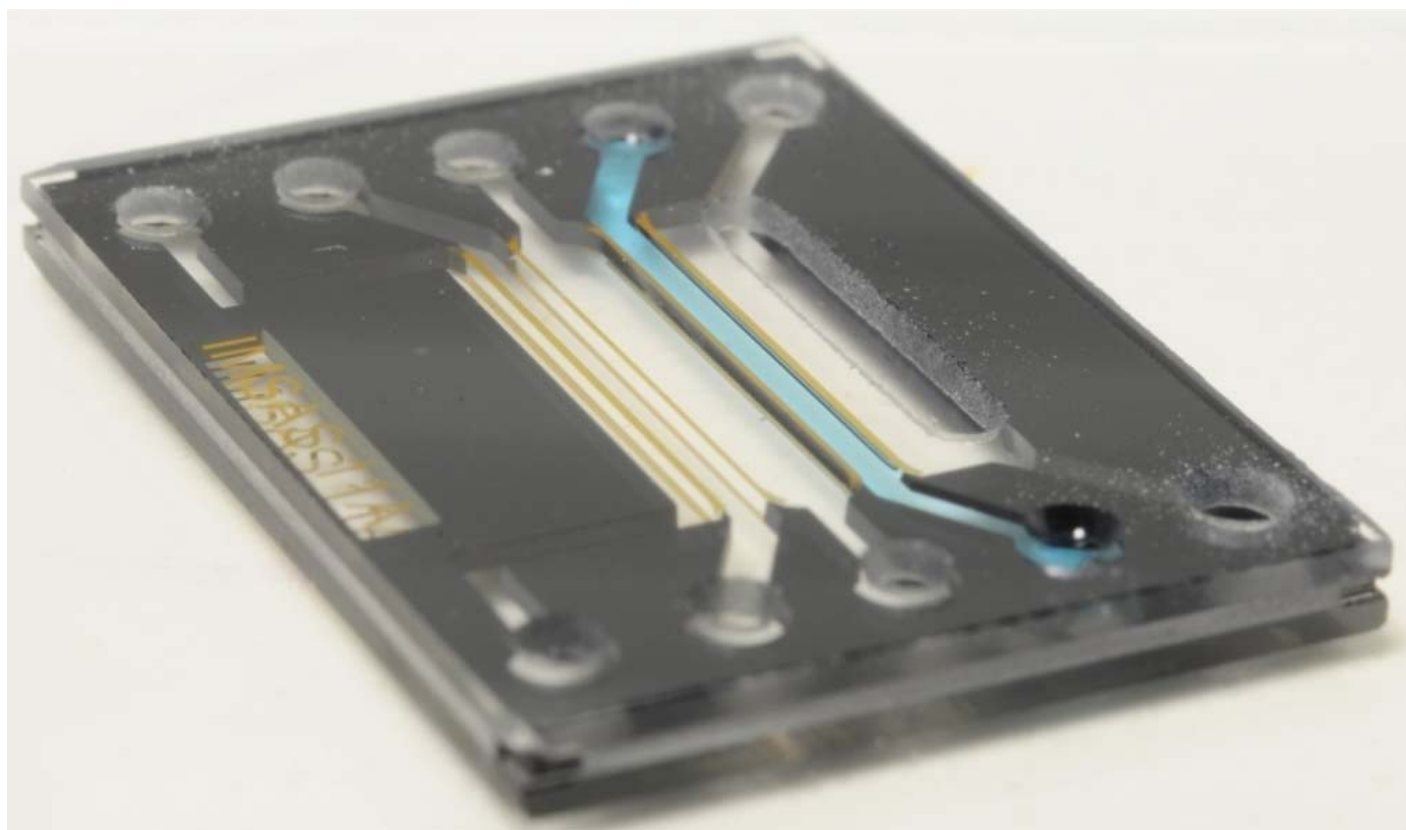
Date: Wednesday, January 30, 2019 at 13:00

Location: ZARM, Room 1730

Microfluidic devices: design, technology, and applications

Prof. Dr.-Ing. Michael J. Vellekoop

University of Bremen, Institute for MicroSensors, -Actuators and -Systems (IMSAS)



LifeChip: Microfluidic chip for the culturing and analysis of mammalian cells

Microfluidic devices allow the physical or biochemical analysis of small samples of fluid. The basis consists of a chip containing microchannels with a typical diameter of 20 to 200 μm . Microactuators and microsensors can be added to the system or integrated into the chip for manipulation and analysis of the fluid.

At IMSAS we have a laboratory (clean room) available for the realization of microfluidic devices, sensors, and microsystems. The chips are made from different materials, such as silicon, glass, or polymers. Since a few years 3D printing (from cm level down to the μm level) is an additional technology to realize microfluidic devices.

We are involved in several projects concerning the analysis of fluids and biological particles such as bacteria or mammalian cells. In the talk, some applications will be discussed to illustrate the design and technology aspects. Examples are multifold microfluidics, phononic sensors for the determination of physical parameters of liquids, a mammalian cell culture chip, dielectrophoresis for particle separation, and on-chip synthetic membranes to mimic bacteria. In addition, some methods for fluidic connections of the chip to the outside world will be discussed.