



FUJII T. LAB.

[Applied Microfluidic Systems]

Center for International Research on Integrative Biomedical Systems

<http://www.microfluidics.iis.u-tokyo.ac.jp/>

Microfluidics, cell engineering, underwater technology and molecular engineering

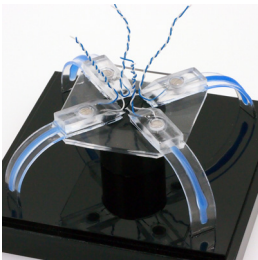
Precision Engineering / Bioengineering

Applied Microfluidic Systems

From Deep-Sea Application to Cell Engineering

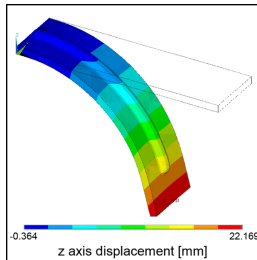
Soft actuator

We have developed a new unique soft actuator based on "Microhydraulics" which uses microfluidic channels and integrated pumps to create 3D motion.



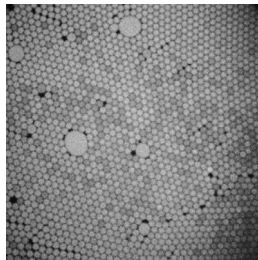
Structural analysis

Numerical simulation based on FEM is performed to analyze and evaluate hyper-elastic deformation of silicone-rubber actuating devices.



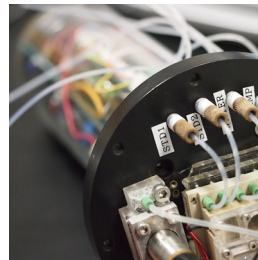
in vitro biochemical networks

Targeting a behavior and encoding it in DNA-based circuits, a bistable memory circuit that can be switched back and forth was demonstrated successfully.



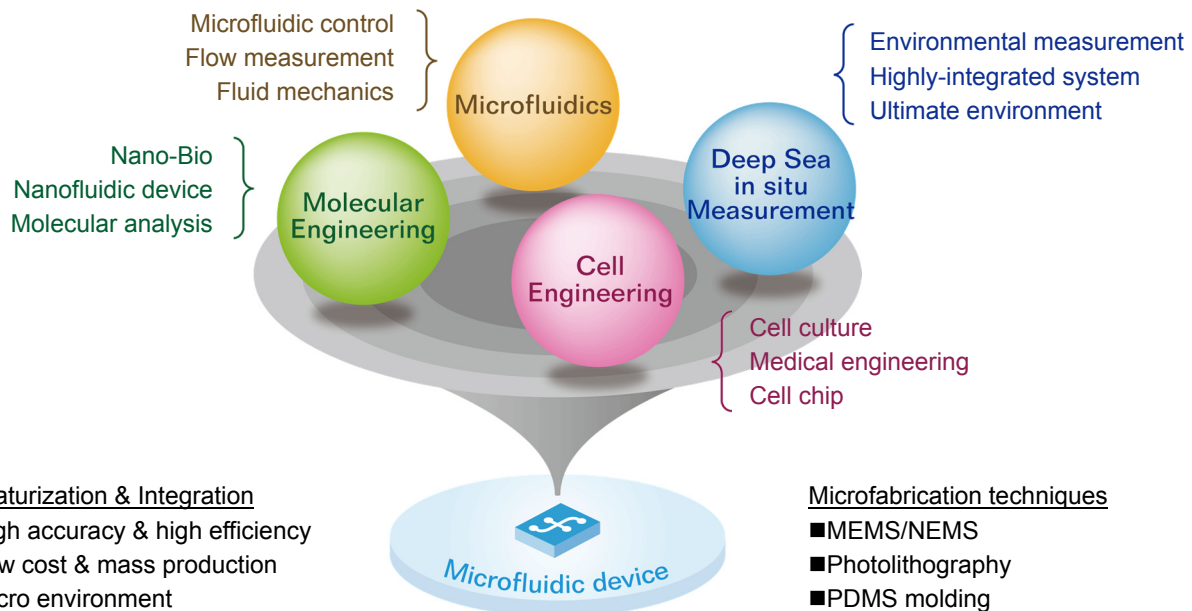
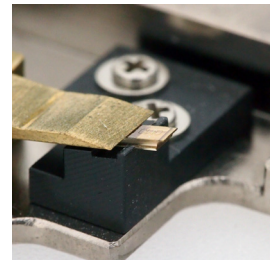
Mn detection in deep sea

Integrated In Situ Analyzer (IISA) for Mn detection has been developed. All necessary components are integrated into a compact body.



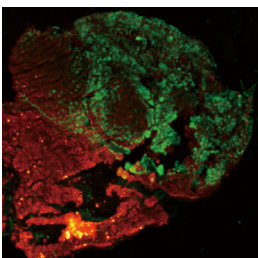
Underwater AFM

A compact AFM system, which is mountable on underwater vehicles, is studied to investigate the nanoscopic samples in deep sea and in situ.



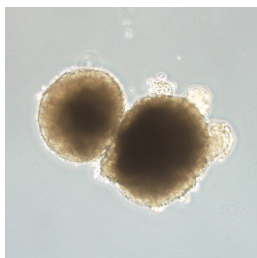
Cell / tissue showcasing

A cell/tissue showcase system which regulates fluidic/adhesive conditions is developed by integrating artificial bio-interface into a microfluidic device.



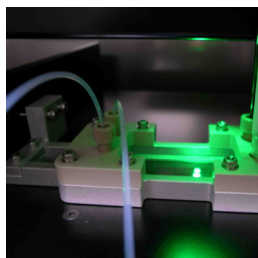
Controlled differentiation

Mouse pluripotent stem cells are seeded in a microchannel and their differentiative state was controlled spatially using microfluidic techniques.



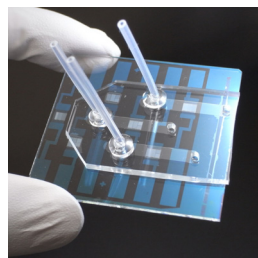
Dynamic concentration control

Microfluidic cell culture system which enables dynamic control of a signal molecule concentration has been developed for cell signaling study.



Single cell analysis

We are developing a micro-well array device to investigate cells individually using key technologies such as EP, electroporation and microfluidics.



CTC analysis

We perform single-cell PCR and immunostaining of circulating tumor cells (CTCs) to show usefulness in diagnosis or treatment of cancer.

