

FUJII LAB.

[Applied Microfluidic Systems]

Department of Mechanical and Biofunctional Systems

Microfluidics, cell engineering, underwater technology and molecular engineering

Precision Engineering / Bioengineering

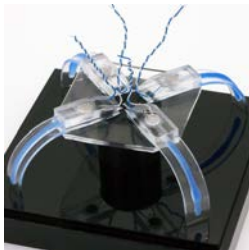
<http://www.microfluidics.iis.u-tokyo.ac.jp/>

Applied Microfluidic Systems

From Deep-Sea Application to Cell Engineering

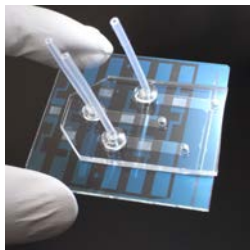
Soft actuator

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



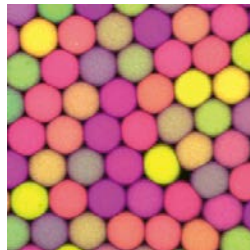
Single cell analysis

We have developed a microwell array device for parallelized single cell analysis using electrostatic functions including dielectrophoresis and electroporation.



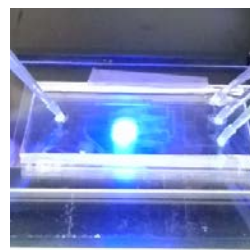
Biochemical networks

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



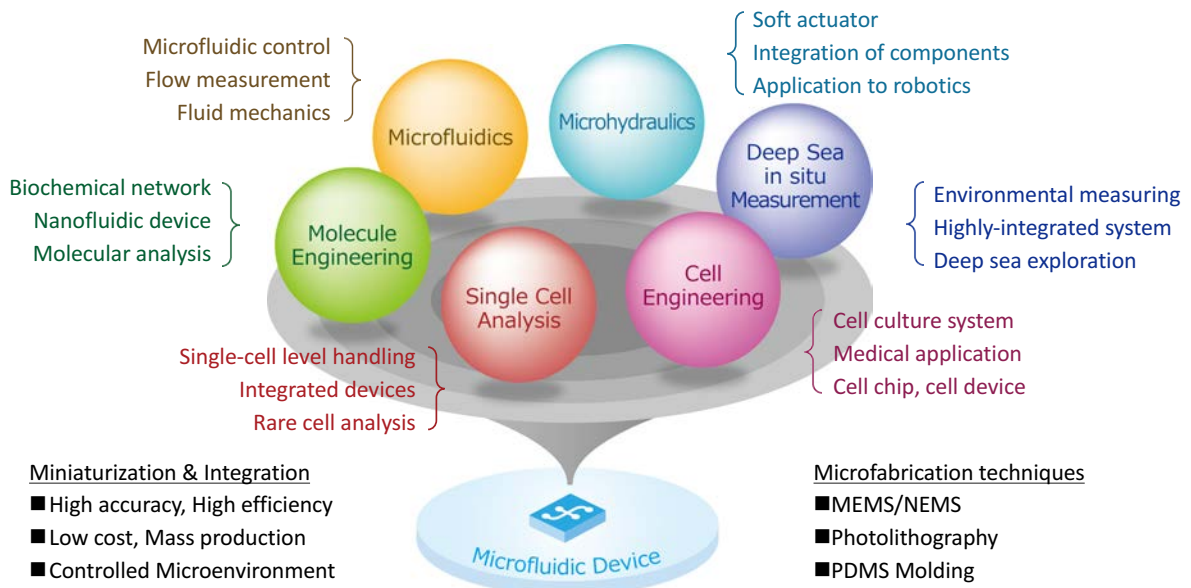
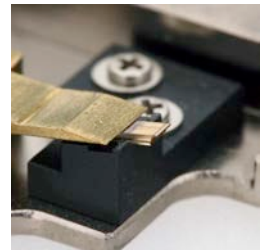
Control of gene expression

We are developing a novel system enabling temporal control of gene expression by combining optogenetics and microfluidics.



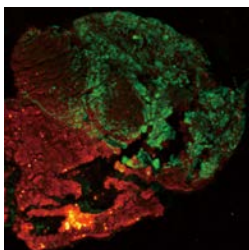
Underwater AFM

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



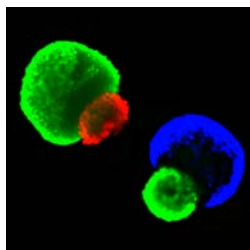
Cell / tissue showcasing

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



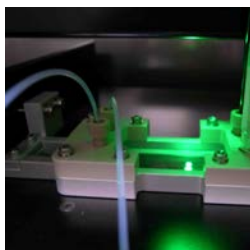
Compartmentalized culture

A compartmentalized culture system for cell aggregate has been developed for spatially controlled differentiation of iPS cells or anticancer drug evaluation.



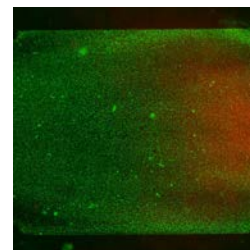
Cell culture system

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



Liver cell culture

We are developing a microfluidic device which allows generation and visualization of oxygen gradients to understand hepatic metabolism.



CTC analysis

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

