Soo Hyeon Kim LAB.

[Biomedical Microsystems]

Department of Mechanical and Biofunctional Systems

Microsystems, Microfluidics, Integrated circuits, biotechnology

Department of Precision Engineering

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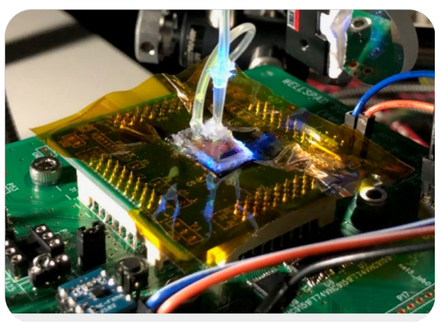
Single-molecule and -cell analysis

We are developing advanced biomedical microsystems by combining microfluidics, integrated circuits and biotechnologies for the analysis of biomolecules and cells. The systems are utilized for the study of living organisms and for the diagnosis and prognosis.

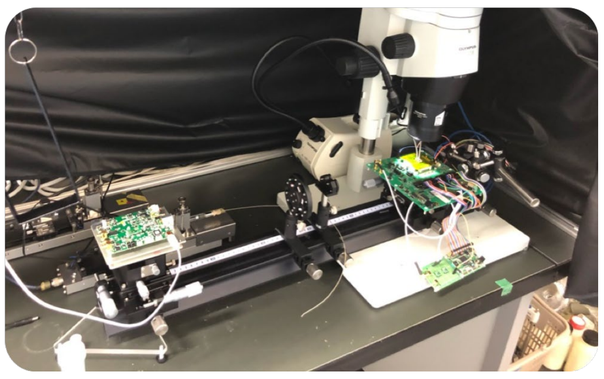
Advanced microsystems

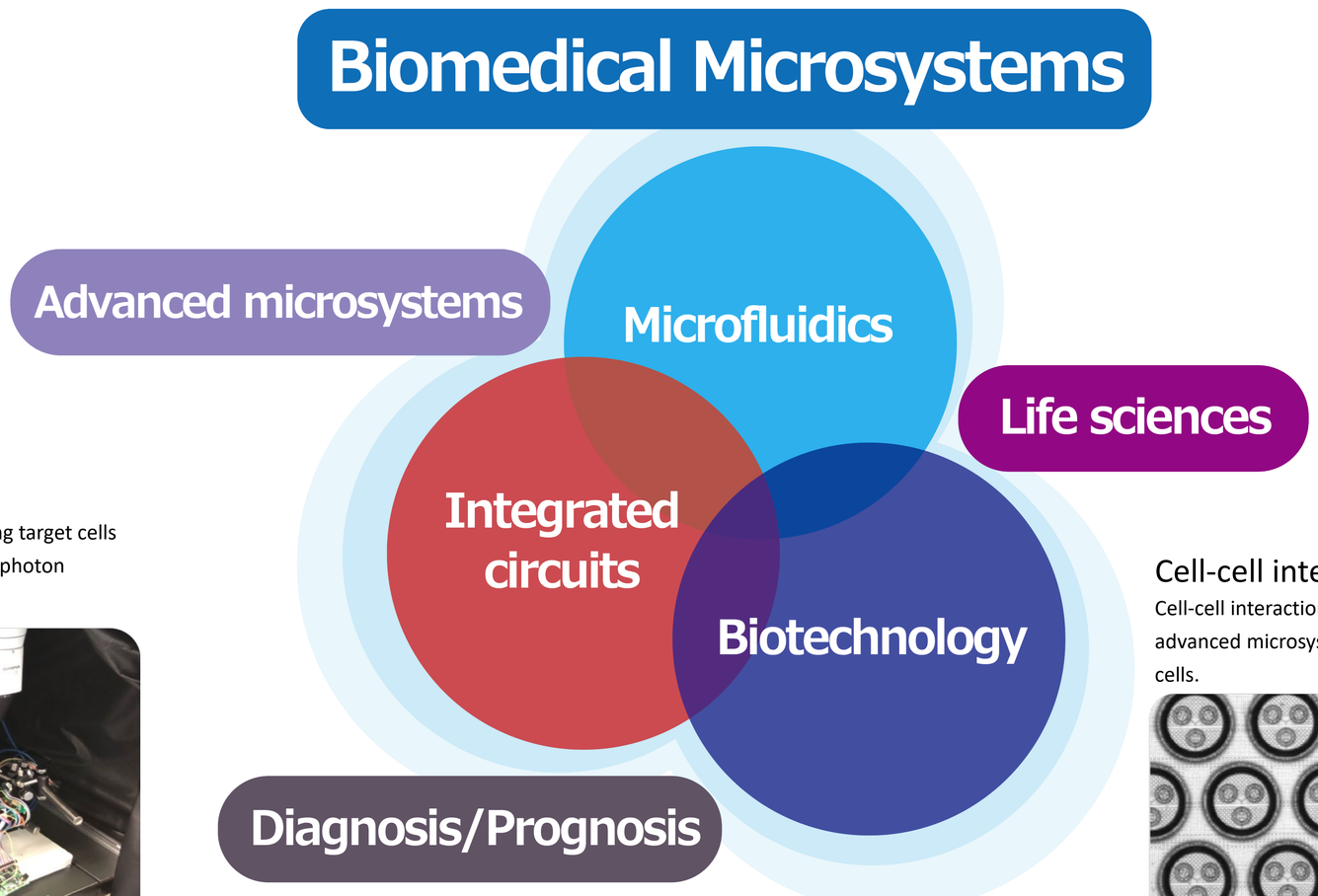
We are developing advanced microsystems by combining microfluidics and silicon integrated circuits.



Cell sorter

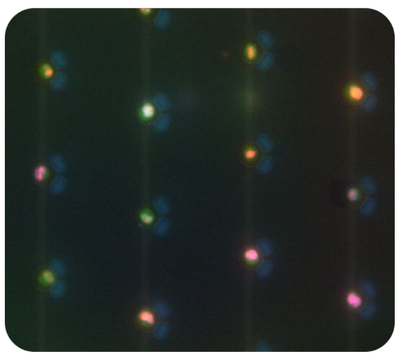
A novel cell sorter for the detecting and separating target cells is being developed by integrating high sensitivity photon detectors and microfluidic devices.





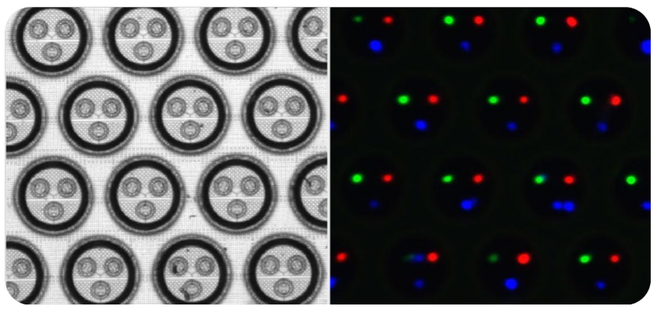
Single cell analysis

We are developing highly efficient single cell analysis system for the analysis of intracellular materials of single cells.



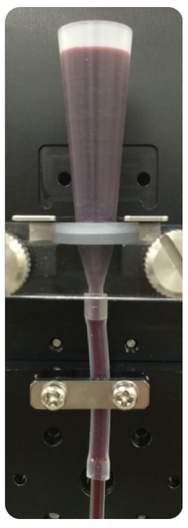
Cell-cell interactions

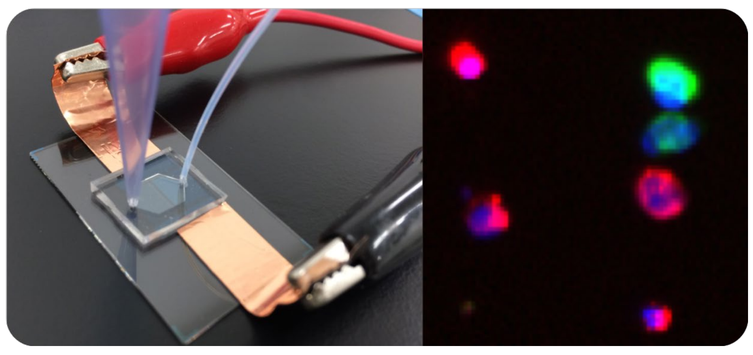
Cell-cell interactions at the single cell level are investigated by using advanced microsystems allowing highly efficient pairing of single cells.



Circulating tumor cells

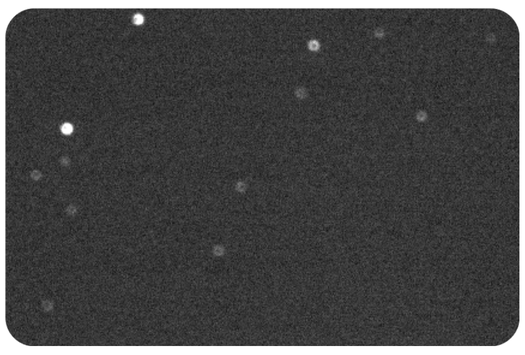
A combination of two independent isolation methods based on physical and biochemical properties is used for the highly efficient cancer marker-free purification. The purified cells are directly used for the downstream genetic analysis. The system is being used for the clinical research.





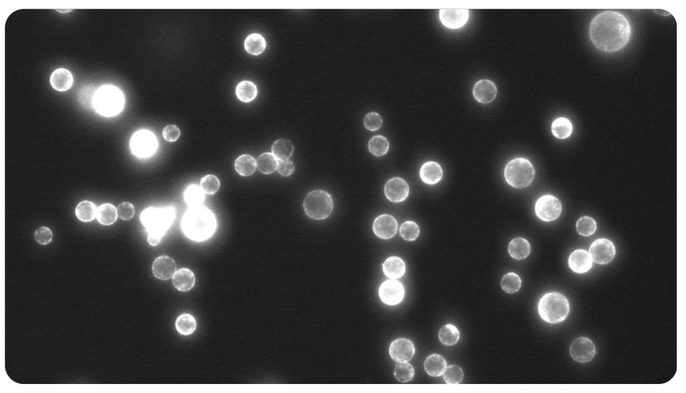
Exosome analysis

We are developing a novel microsystem for the detection of single exosomes using Picoreactors, followed by transcriptome analysis for the exosomal RNAs.



Circulating tumor DNAs

By using DNA capturing microbeads, high sensitivity detection of circulating tumor DNAs is carried out to realize liquid biopsy.



The Biomedical Microsystems are utilized for the analysis of single molecules and cells to overcome the limits of the biochemical analysis methodology. The systems are mainly applied to the liquid biopsy for the diagnosis and prognosis of cancers to realize personalized medicine.