

生研公開 藤田・年吉研 Bio CMOS/MEMS Platforms

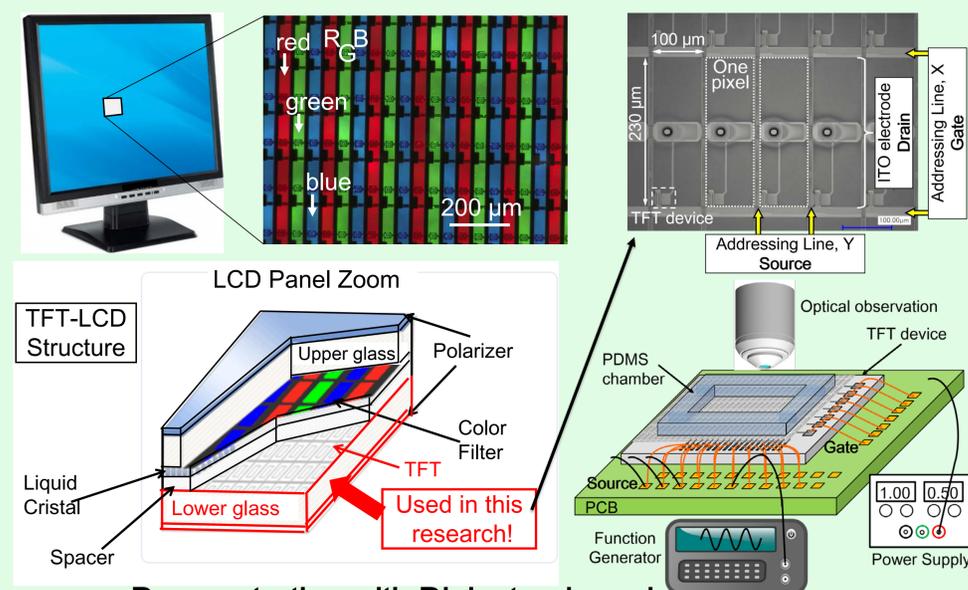
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Precise and sensitive tools are needed to investigate further in the cell biology field: to track disease, develop new drugs, or for more fundamental understanding of biological phenomena. Here, new tools for biological cells and chemical analyses, in the shape of multi purposes platforms, are proposed. They are hybrid systems with integrated micro-electronics, micro-fluidics, and sensors. They allow a multitude of investigation approaches: electrical, optical, chemical and biological.

TFT Display Panel Technology as a Base for Biological Platform

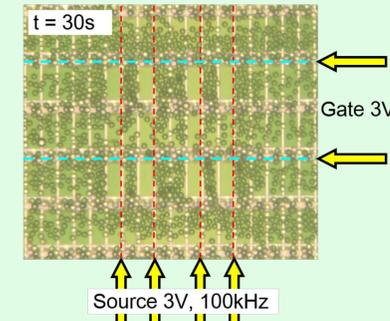
Purpose: Thanks to the TFT display panel technology a transparent platform, in glass, covered with a dense array of microelectrodes can be obtained. This research demonstrates the possibility to use such a technology for biological cells applications like manipulation, sensing, electrical and optical studies.

Originality: Possibility to create a biological multi-purpose platform.

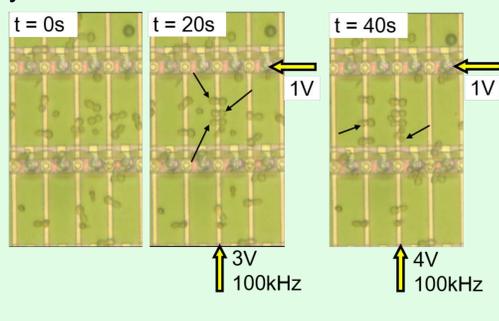


Demonstration with Dielectrophoresis

Negative Dielectrophoresis with 10μm beads



Positive Dielectrophoresis with yeast cells

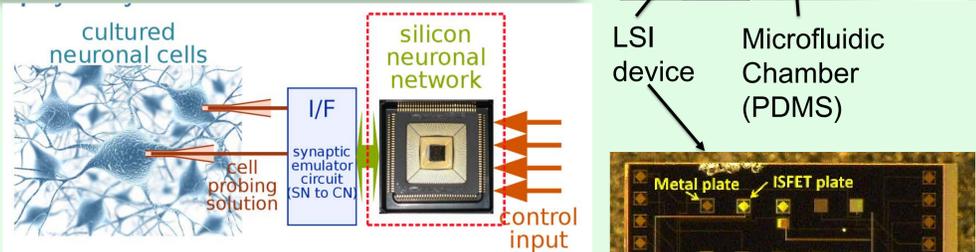
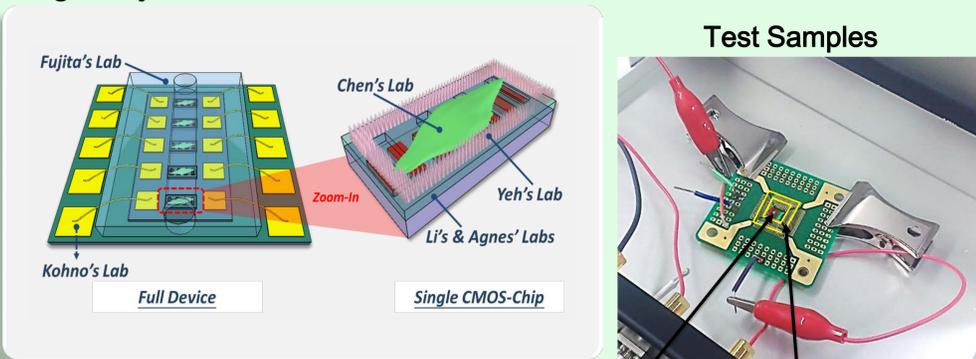


Japan-Taiwan Collaborative Project: Neuron-on-CMOS-MEMS Platform

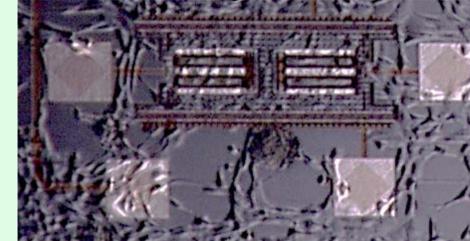
Partners: National Tsing Hua University (Taiwan) & IIS - The University of Tokyo

Purpose: A microfluidic-based platform for cultured neuronal network. Connectivity and complexity are controlled artificially by using nanostructures. The purpose is to connect such platform with an artificial silicon neuronal network.

Originality: Interface bio-neuron with artificial-neuron.



PC12 neurons growth on an LSI



pH sensing and neurons activity measurements are under investigation

CMOS / MEMS Devices for Biological Cells Analyses

Partners: ENS Cachan (France); IIS - Utokyo; VDEC - UTokyo

Purpose: Electrical analyses (impedance) and manipulation (fusion) of cells on an LSI device.

Originality: Integration of the microfluidic with LSI. Electrical characterization of cells with LSI improves the sensitivity.

