

BJ KIM LAB.

[Micro Components & Systems]

Centre for International Research on MicroNano Mechatronics

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

NEMS, Bio-MEMS/Flexible microsensors

Precision
engineering
department

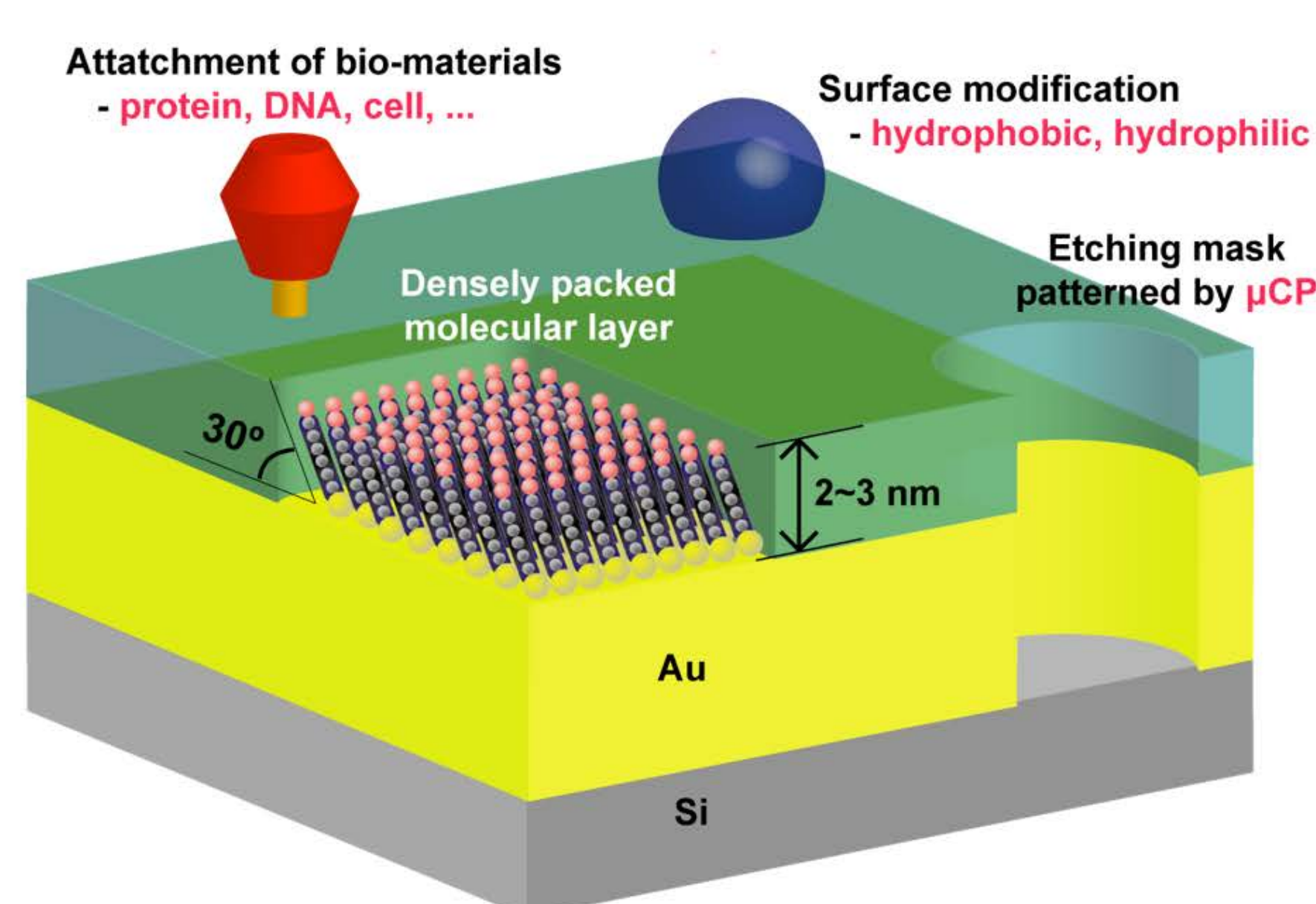
Advanced NEMS (Unconventional Nano fab.)

NEMS meets Bio-sensing, Smart sensors around you!

Our research goals are to build functional nanosystems and fabricate nanoscale devices, in particular for bio-sensing in singular level, through both bottom-up and top-down approaches. Key technologies concentrate on high-resolution surface patterning with simple, low-cost techniques such as several types of micro-contact printing (μ CP), flexible polymer based soft lithography, and micro even nano shadow-masks patterning.

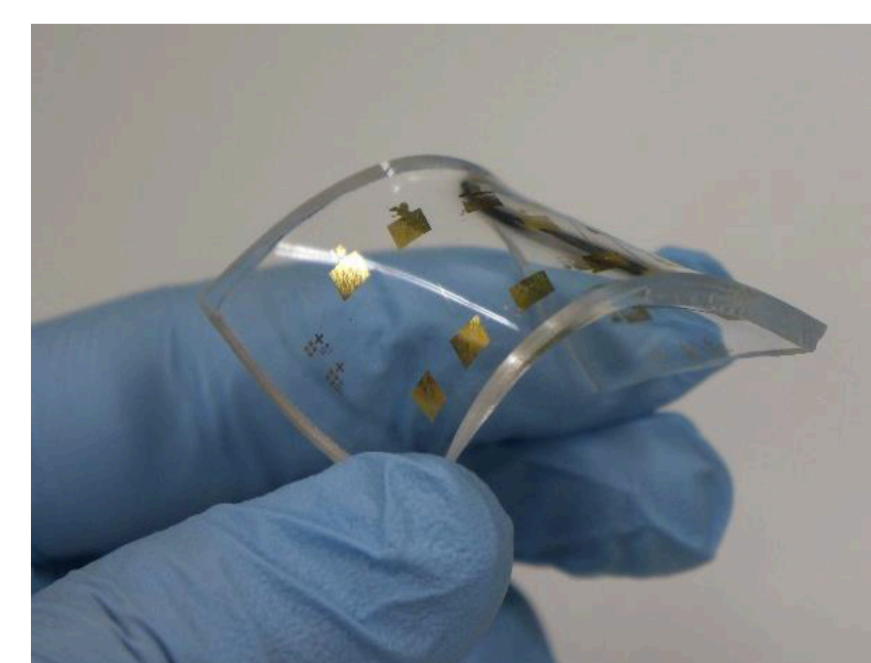
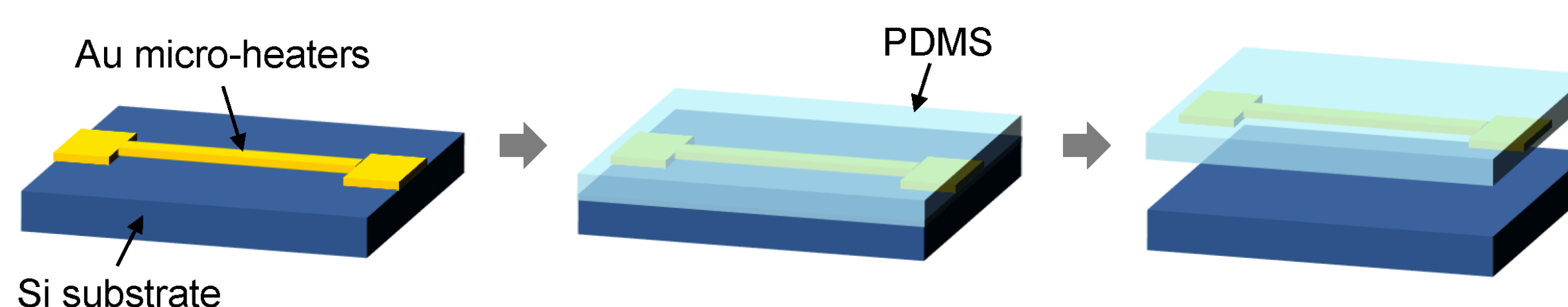
Based on these studies on nano/micro components for the fabrication of novel nano devices, we investigate to develop various micro sensors for biological applications, such as i) MEMS device for electrical/physical characterization of single cell, ii) Tribo-electric nano generator, energy harvesting MEMS components for wearable sensors, iii) temperature measurement on resistively heated nano/micro wires for the study on single cells.

On the other hands, thermal conductivity in nanoscale, specially affected by contribution of surface phonon-polaritons (SPPs), is investigated with micro/nano heaters.

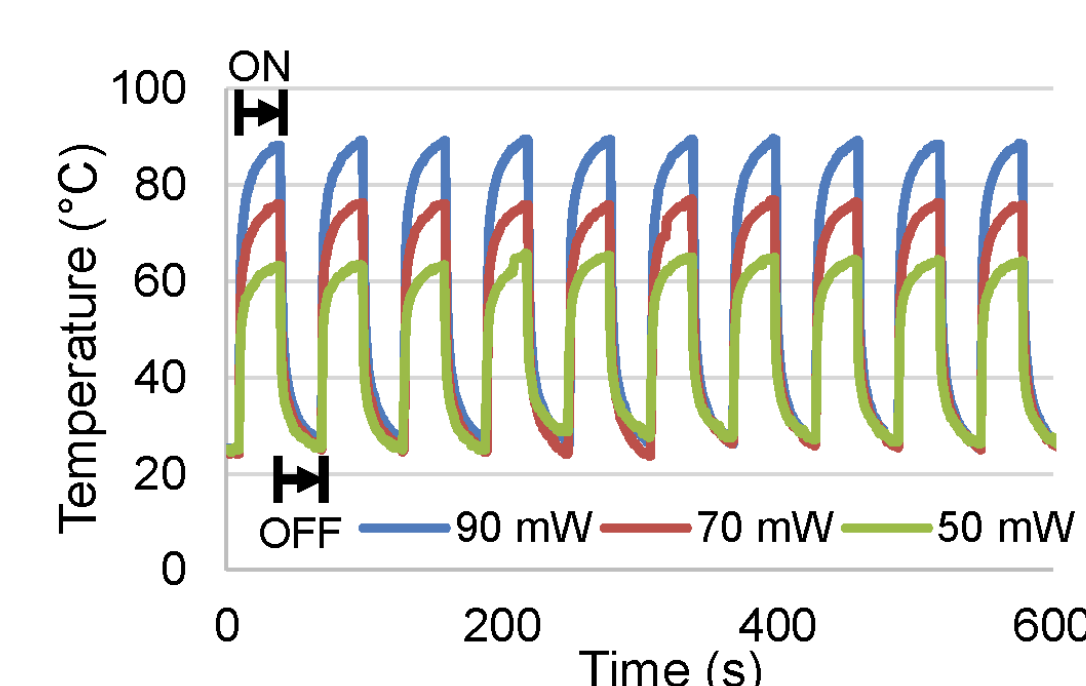


SAM (Self-Assembled Monolayer) meets MEMS

Dry peel-off process

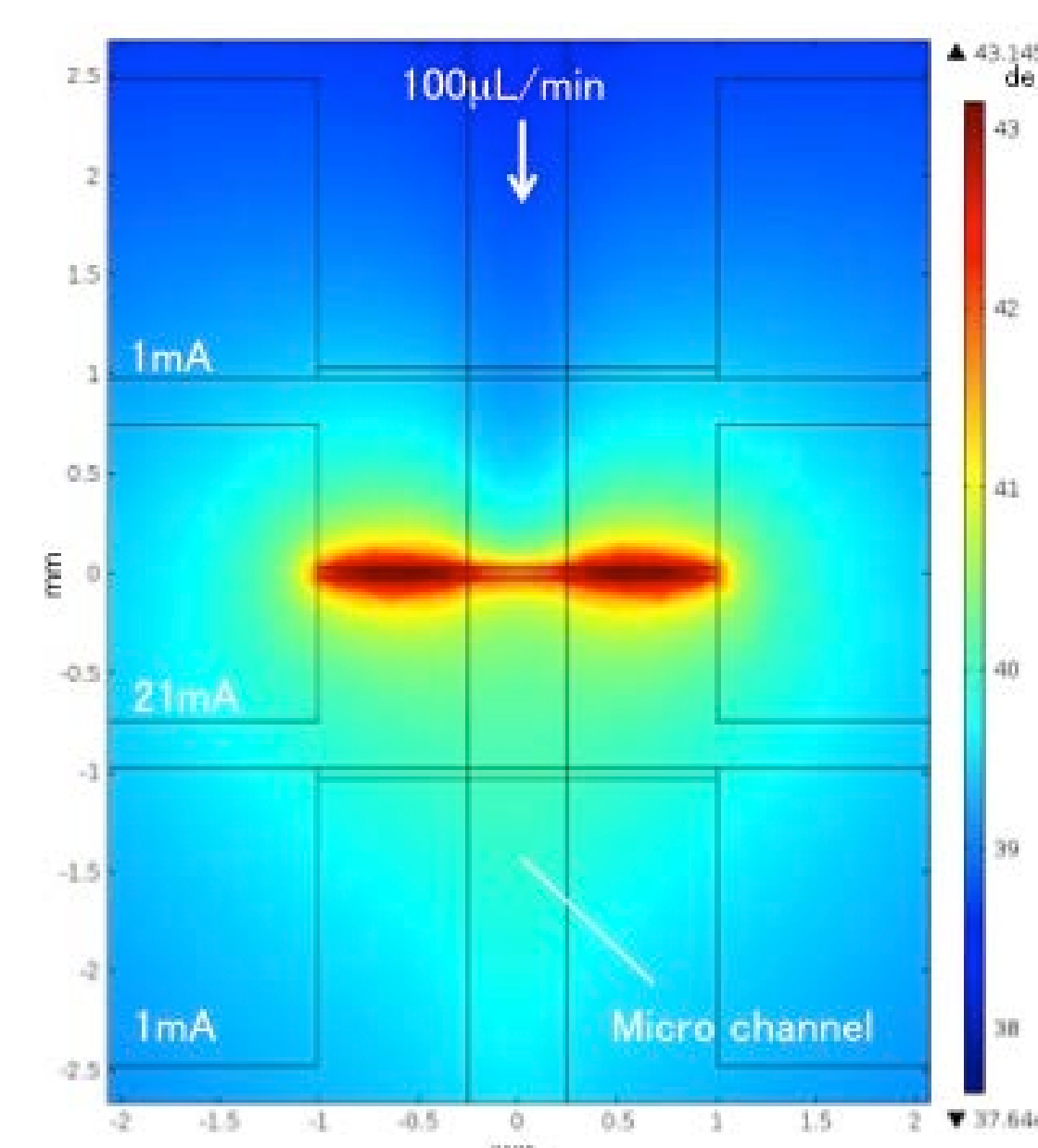
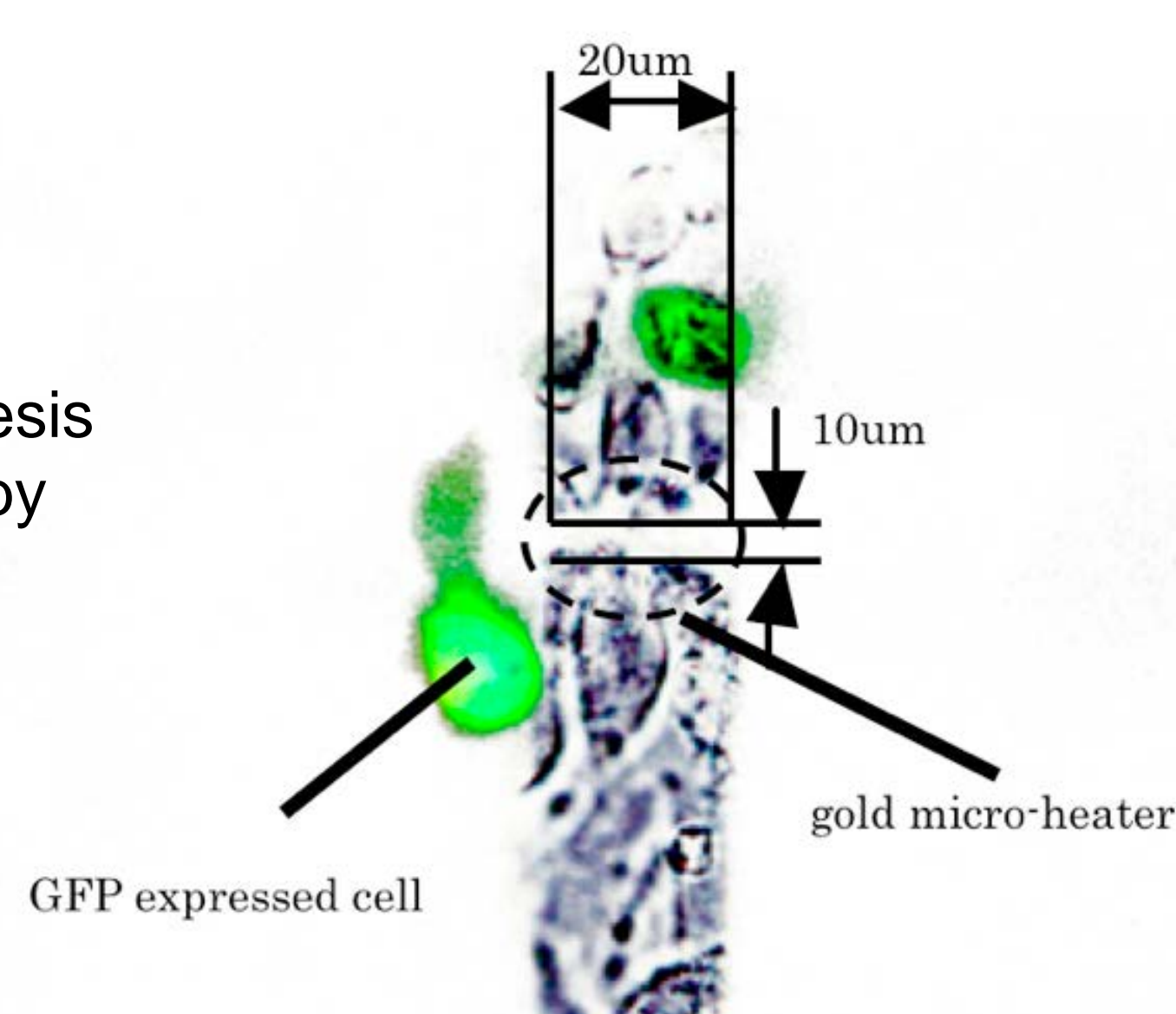


Au micro-heaters embedded in PDMS



Repeatability test

Heat-shock-protein synthesis
in animal cells induced by
micro wire heaters

Temperature
distribution in micro
fluidic channel with
local heater