

# BJ KIM LAB.



## [Micro Components & Systems]

Centre for International Research on MicroNano Mechatronics

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

**NEMS, Bio-MEMS/Bio-Sensor**

Precision  
engineering  
department

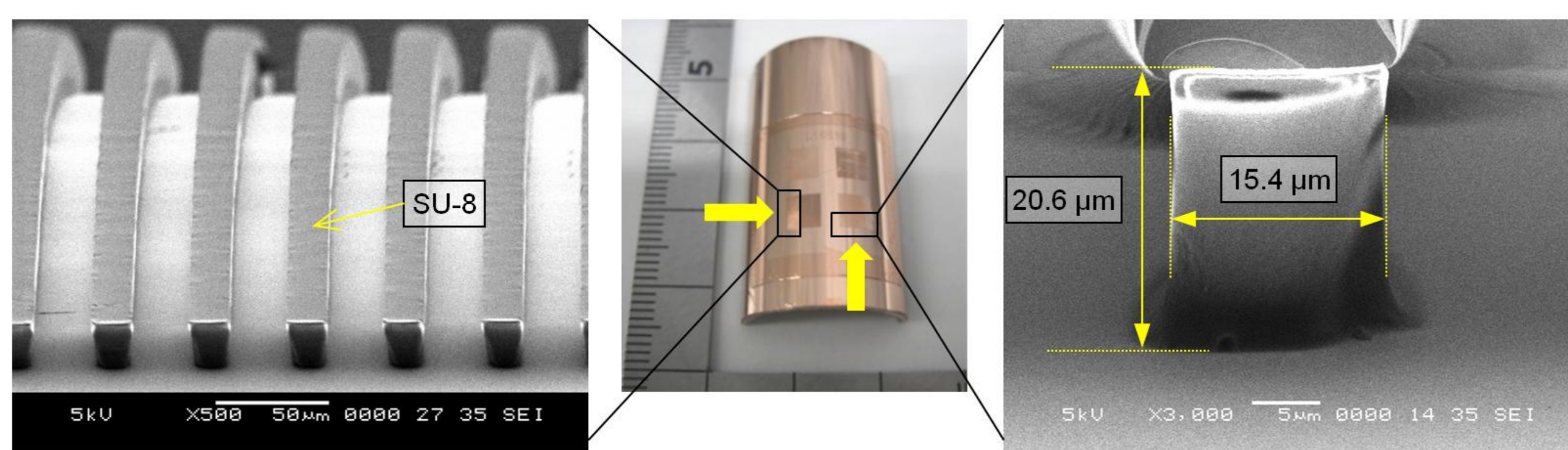
### Advanced NEMS (Unconventional Nano fab.)

NEMS meets Bio-sensing, Useful Nano components device

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 various types of micro-contact printing ( $\mu$ CP), flexible polymer based soft lithography, and micro even nano shadow-masks patterning.

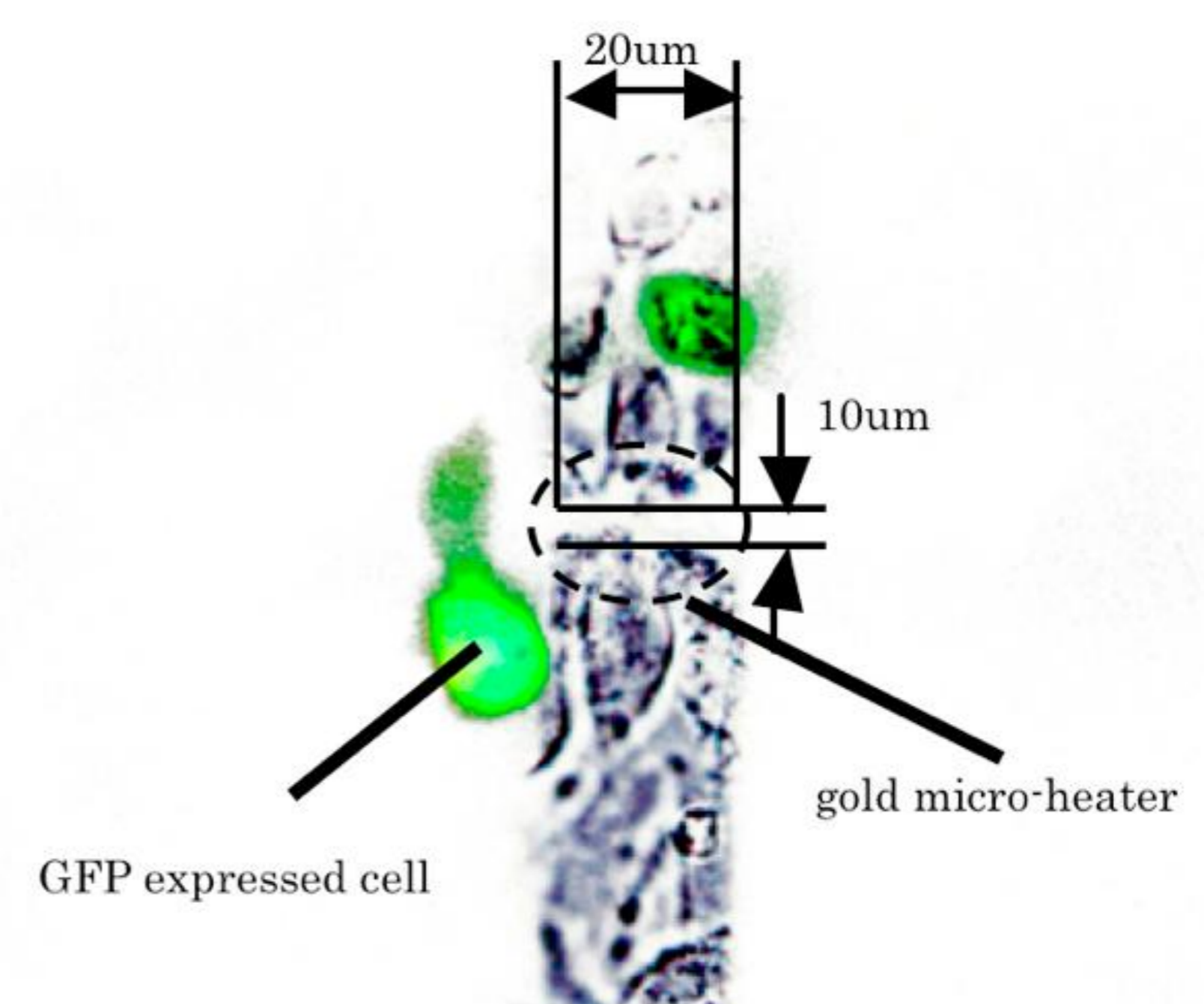
Based on these studies on nano/micro components for the fabrication of novel nano devices, we investigate to develop various micro sensors for biological applications, such as i) MEMS device for electrical/physical characterization of single cell, ii) single cell electroporation microchip for gene transfection, iii) temperature measurement on resistively heated nanowires for the study on single molecules, etc and investigate vi) length-dependent mobility of DNA in nanofluidic channel fabricated by novel process.

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

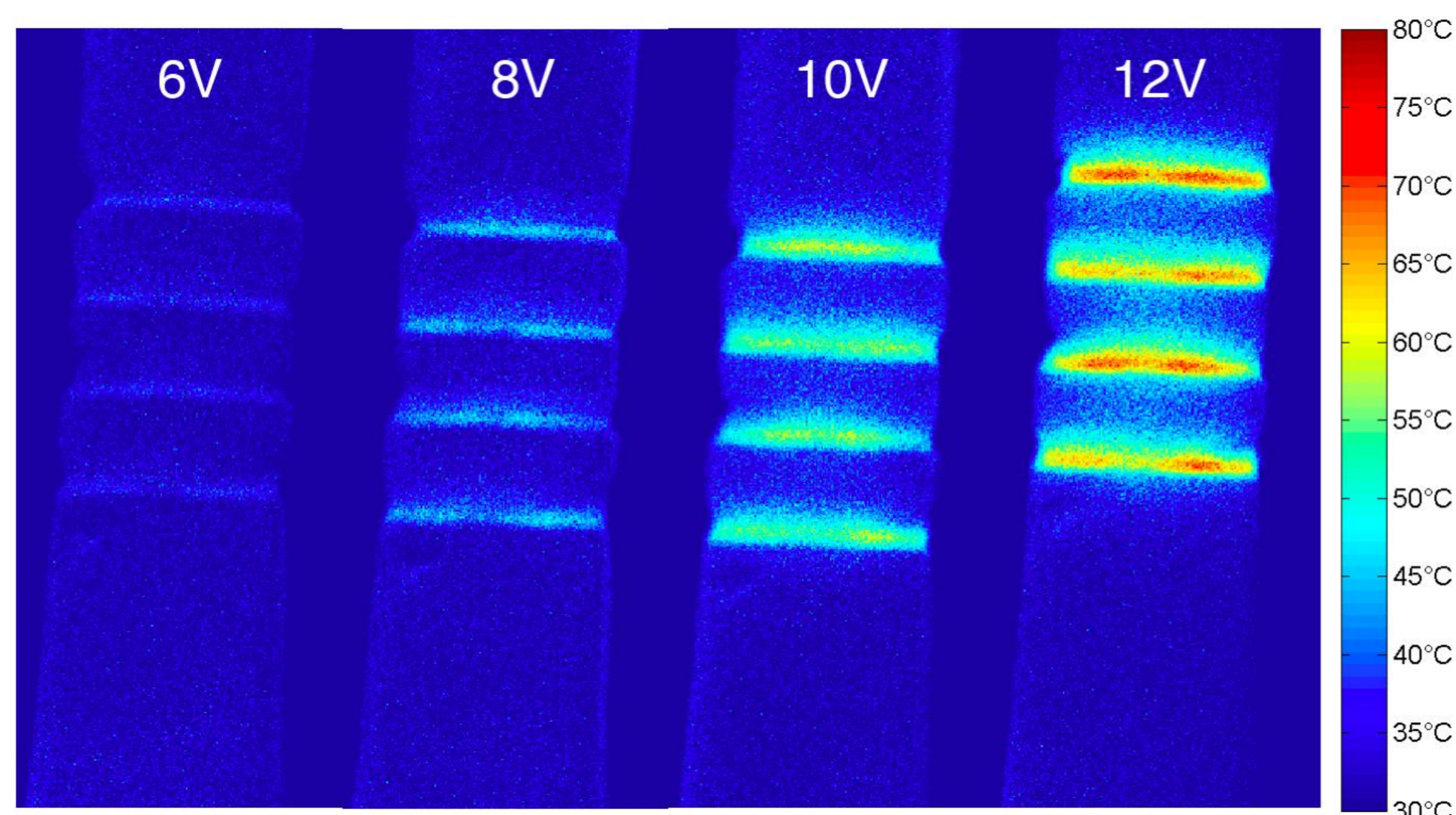


SU-8 Patterns with Line Width: 15  $\mu$ m / Space: 30  $\mu$ m

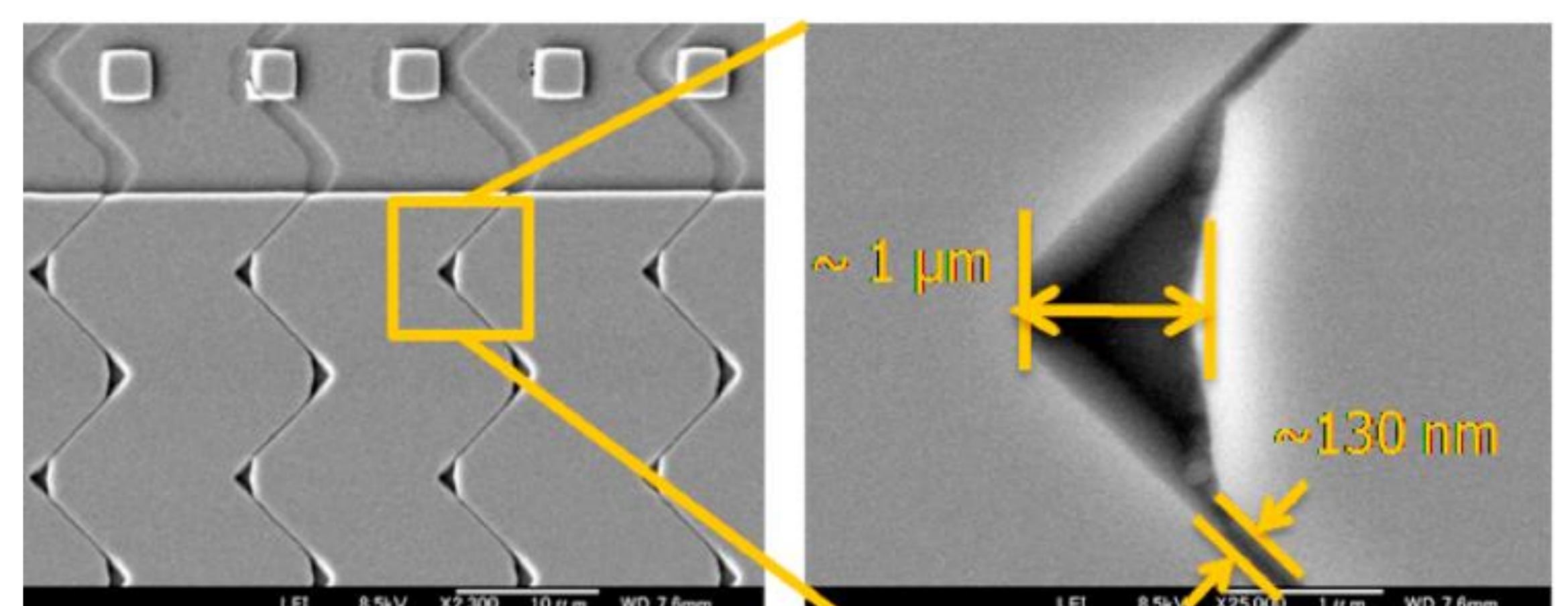
Optical Soft-lithography for 3D surface patterning



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



Nanoscale fluorescent thermometry and nanowire fabrication



Fabrication of various nano channels with micro chambers for single DNA detection