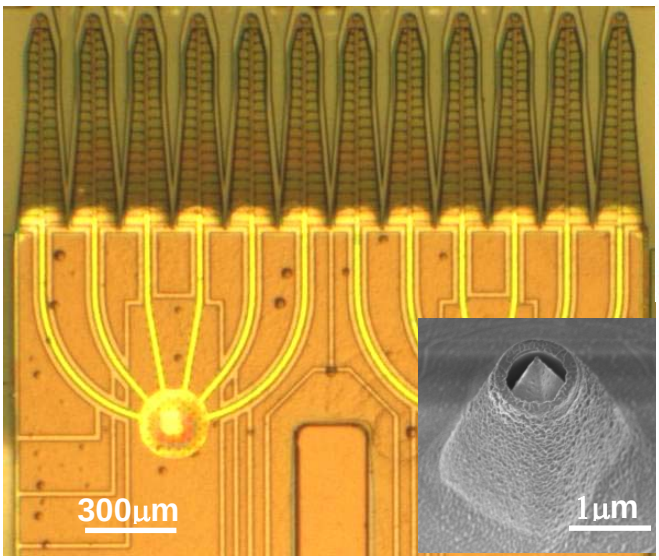
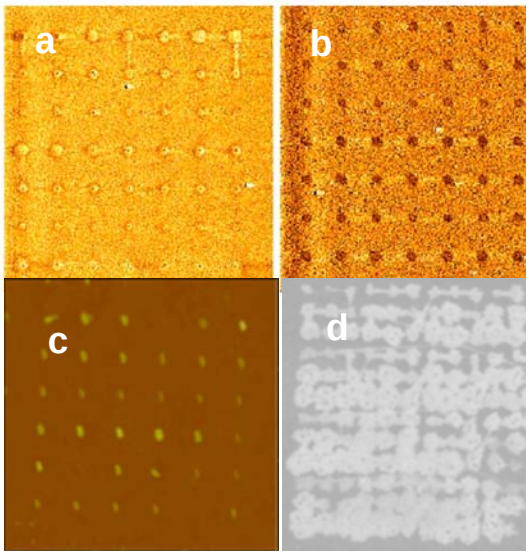
4.1.4 NANO FOUNTAIN PROBE LINEAR ARRAY WITH TWO INK WRITING CAPABILITY

H. D. Espinosa, N. Moldovan, "Scanning Nanodispensing Device using Cantilevers with Microchannels and Nanotips – Design and Fabrication," U.S. application, filed 2005, NU 25074.

Building on the previous work developing nanofountain probes, these NU-NSEC researchers developed and tested a second-generation linear array of 12 parallel writing probes, fed from two on-chip microreservoirs via microchannels embedded in cantilevers. The volcano-shaped structures pictured below deliver liquid ink around the AFM tip. The presence of fluid ink and the special design and elasticity of the probes make this writing mechanism slightly different from dip-pen nanolithography. This new development allows writing with a larger variety of inks, such as inks containing suspensions of solid nanoparticles, which was not possible with standard dip-pen nanolithography techniques. The primary interest in this new development is its use with organic and biomolecules, such as proteins and DNA, to perform nanoscale assays.



General view on the chip with its cantilevers and inset with view of a volcano probe.



Patterns written with the new nanofountain probe: a, b) parallel writing with two inks: MHA (a) and PFT (b); c) hybridized DNA array; d) diamond nanoparticles deposited from ethanol suspension. All dot patterns have 2 µm pitch.