The Qin Lab (EECE) is developing “top-down” approaches to nanofabrication using soft lithography. Based on printing, molding, and embossing with a transparent elastomeric stamp (Fig. A), soft lithography represents a conceptually new technical approach to rapid prototyping of various types of micro- and nanostructures and devices on planar, curved, and flexible substrates at low cost. Five techniques – microcontact printing (Figs. B and C), replica molding, microtransfer molding, micromolding in capillaries, and solvent-assisted microcontact molding – formulate the basis of soft lithography. All of these techniques share one thing in common: the use of organic materials and polymers – “soft matter” in the language of physicists. Recently, Qin Lab has developed solvent-assisted nanomolding (SANAM), a new addition to the soft lithography, which provides an easy route to generating nanoscale structures in a variety of soft materials, in parallel, over large areas, and at low cost. For example, SANAM is capable of producing nanostructures (Fig. D) that can be further developed as new substrates for surface-enhanced Raman scattering (SERS). These nano-chips will provide an extremely powerful platform for the sensitive and selective detection of trace analyte commonly encountered as toxic industrial chemicals, chemical warfare agents, biomarkers, and even explosives.


Qin Lab: [www.nanocages.com/qin](http://www.nanocages.com/qin)