

The Tip-Based Nanofabrication Program

Thomas W. Kenny

Defense Advanced Research Project Agency
Microsystems Technology Office (MTO)
3701 North Fairfax Drive
Arlington, Virginia 22203-1714

Recent years have seen rapid developments in the ability to fabricate nanostructures and in experiments showing great potential for applications. In general, existing fabrication methods either produce large quantities of disordered structures, or produce large quantities of identical structures. In order to have a real *nano-technology*, it is important to be able to control the fabrication processes in a way that produces controlled diversity, so that we can build devices and systems.

The primary goal of the Tip-Based Nanofabrication (TBN) program is to develop the capability to controllably manufacture nanostructures, specifically nanowires, nanotubes, and quantum dots, with nanometer-scale control over the size, orientation, and position of each individual nanostructure. TBN aims to enable this revolutionary capability through approaches that utilize functionalized AFM cantilevers and tips, due to their ability to manipulate environments at the sub-micrometer scale on the surface of a substrate, creating high temperatures, high fluxes, and high electric and magnetic fields, as well as optical and bio-inspired techniques.

The TBN program has been running since May, 2008, and preliminary results from a wide diversity of fabrication approaches are encouraging.