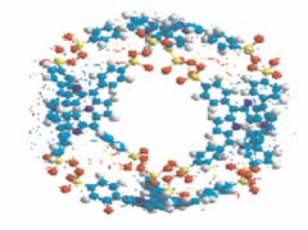


National RTD priorities programme
***"Functional materials and molecular mechanisms"* 2003-2006.**

Coordinator : Kaunas University of Technology (www.microsys.ktu.lt)
Prof. Valentinas Snitka (vsnitka@ktu.lt)

The goal of the programme is to generate a new knowledge and to develop the specific key tools and materials for the nanostructuring of matter down to the molecular scale.

Research is oriented to the nanoscience of single molecules and molecular structures. Instrumentation, based on Scanning Probe Microscopy methods (AFM, STM, SNOM) was developed and set up to study placement and manipulation of molecular and mesoscopic structures on the inorganic and organic surfaces (cells), the growth and formation of novel nanotubules, nanowires and sieve like structures, the electrical and mechanical properties of macromolecular manufactured structures as a building blocks for nano-architecture.

The research efforts is focused on a self-assembly process for creating molecular and composite matrix nanostructures based on synthesis of porphyrins, sol-gel ferroelectric thin films and nanoporous glasses.

The engineering at the nanoscale is focused to the development of novel functional ferroelectric thin films by controlling their nanostructure, AFM based polarization nanolithography, mechanics of nanostructures with application to nanotribology and nanomanipulation, mechanics of biostructures and cells for diagnostics and drug delivery.

The important part of the programme is the dissemination of the newly generated knowledge of nanoscience through the education, conferences and technology transfer to the industry.

Program unites 7 research groups of Kaunas University of Technology, Vilnius University, University of Agriculture, University of Vytautas Magnus, Institute of Semiconductor Physics, 2 SMEs and consist of 16 scientists and 11 PhD students.

The instrumentation developed and set up at Research Center for Microsystems and Nanotechnology:

Scanning Near Field Optical microscope with photon counting and fluorescence imaging

Biological AFM combined with inverse optical microscope and possibilities for single cell manipulation.

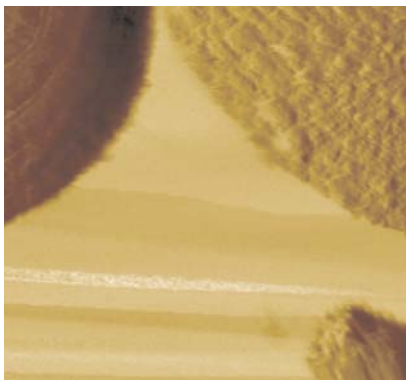
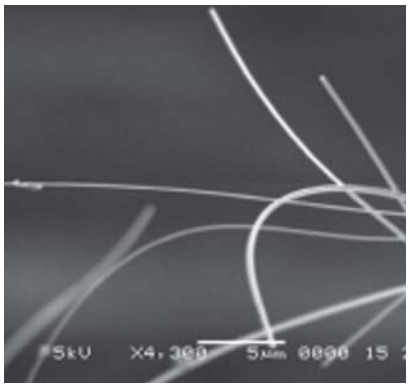


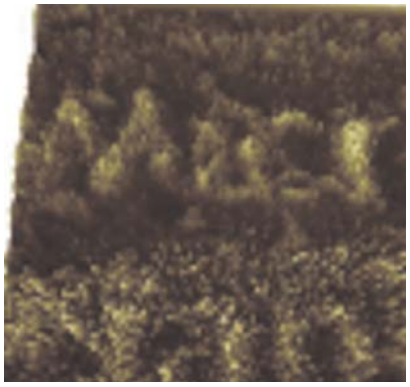
Image of red blood cells made in vitro

Innovative technologies based on program research:



Carbon nanotubes growth in air by new catalytic method

Self-assembled porphyrin nanotubes



AFM nanolitography: Polarization-patterned PZT film with complex patterns of written words "micro, nano" (scan area: 1 x 1 μ^2)

Contact: Prof. Valentinas Snitka, RC for Microsystems and nanotechnology, KTU,
E-mail: **vsnitka@ktu.lt**

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