

## Research at CSSNT

CSSNT (Center for Surface Science and NanoTechnology) is consistently rated among **one of the top research centers** not only in UPB but also in the world scientific community for the **quality** and **breadth** of its research enterprise as well for the **excellence of its Ph.D. programs**.

CSSNT's core research team is made up of several Professors, 2 post-doctoral fellows, 4 doctorate students, and 3 master students. In addition, many undergraduate students participate in cutting-edge research projects as part of their coursework.

The main purposes of the CSSNT are to:

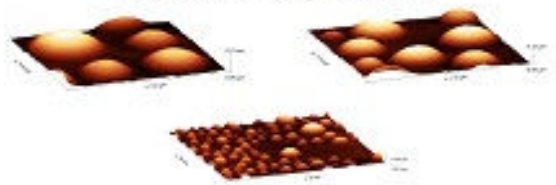
- **Create the best environment** for faculties and students working on **nanoscale science** and engineering with **state-of-the-art facilities** for nanoscale imaging, characterization, synthesis, and production;
- **Educate the next generation of scientists** in nanoscale science and engineering;
- **Deepen and expand collaborations** with **industry** and **national/international laboratory**;

### Image gallery

- ✓ State-of-the-art Scanning Probe Microscopy technique (AFM, SPM, SKPM, STM, MFM)

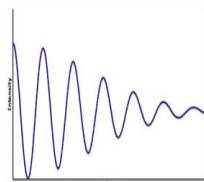


AFM Atomic Resolution: we can see the atoms.

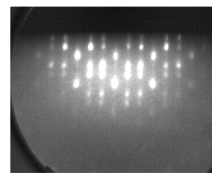


Scanning Polarization Force Microscopy: we can "touch" liquids.

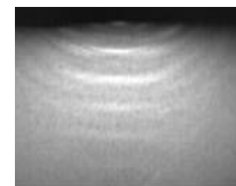
- ✓ "Molecular Beam Epitaxy" - Pulse Laser Deposition (MBE-PLD) under low, high and ultra-high vacuum. Layer-by-layer deposition via RHEED oscillations.



RHEED oscillations

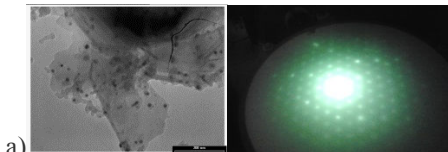


(111)-epitaxial growth.

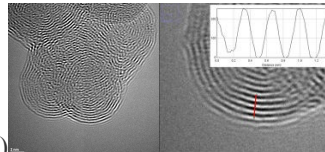


Polycrystalline growth.

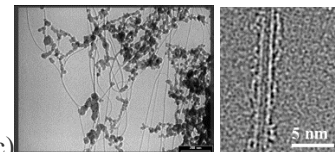
- ✓ Synthesis of carbon nanostructures by laser ablation technique involving KrF excimer laser and an innovative ablation chamber design.



a)



b)



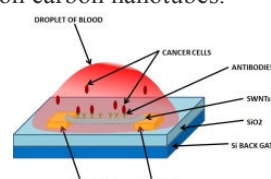
c)

a) Graphene: the world's new wonder material; b) Carbon nano-onions: about 8000 times smaller than a human red blood cell; c) Single Walled Carbon Nanotubes: about 75000 times thinner than a human hair.

- ✓ Fabrication of 3<sup>rd</sup> generation of solar cells and biosensors based on carbon nanotubes.



a)



b)

a) Test sample of the 3<sup>rd</sup> generation solar cells. b) Conceptual design of a biological sensor based on Carbon nanotubes – Field Effect Transistor, for early cancer detection.