MICRO429-Metrology Practicals

AFM

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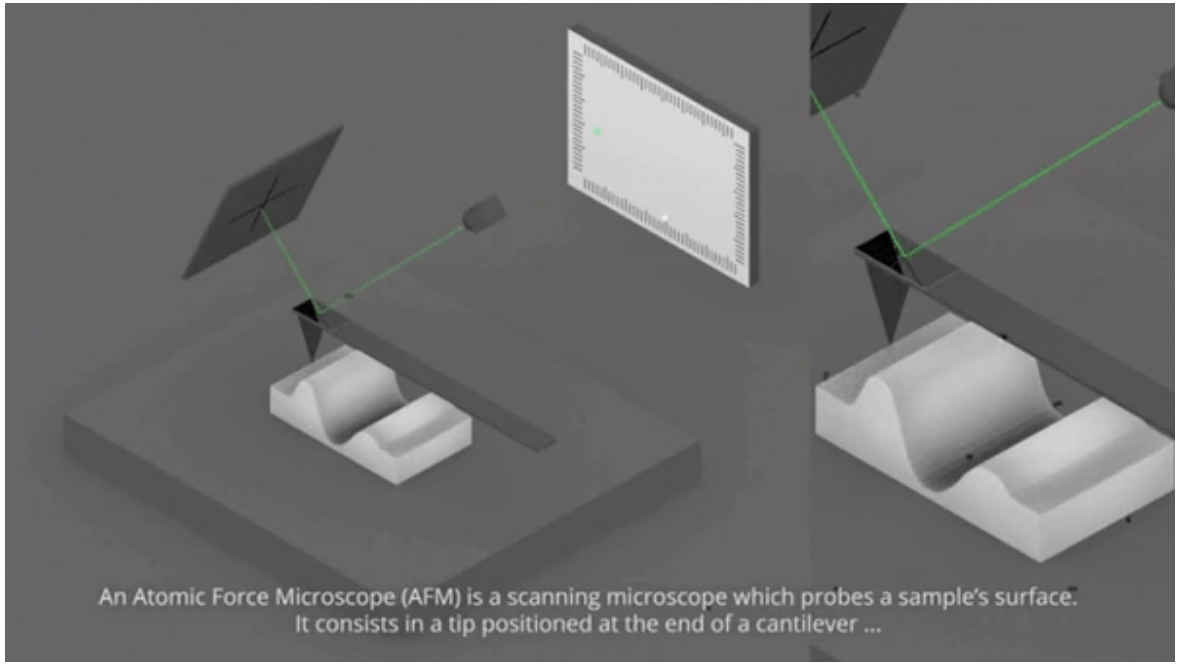
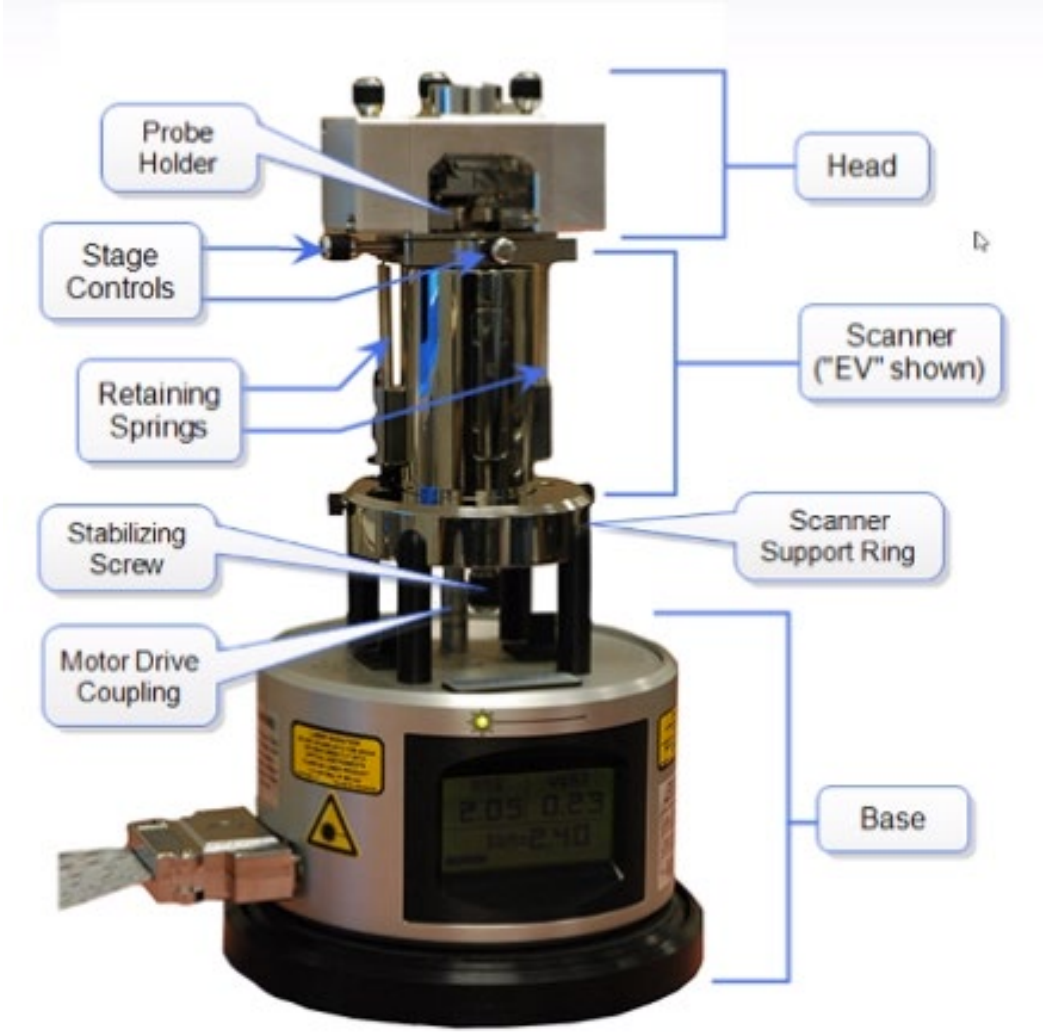
AFM setup


An Atomic Force Microscope (AFM) is a scanning microscope which probes a sample's surface.
It consists in a tip positioned at the end of a cantilever ...


Probe Holder
Stage Controls
Retaining Springs
Stabilizing Screw
Motor Drive Coupling
Head
Scanner ("EV" shown)
Scanner Support Ring
Base

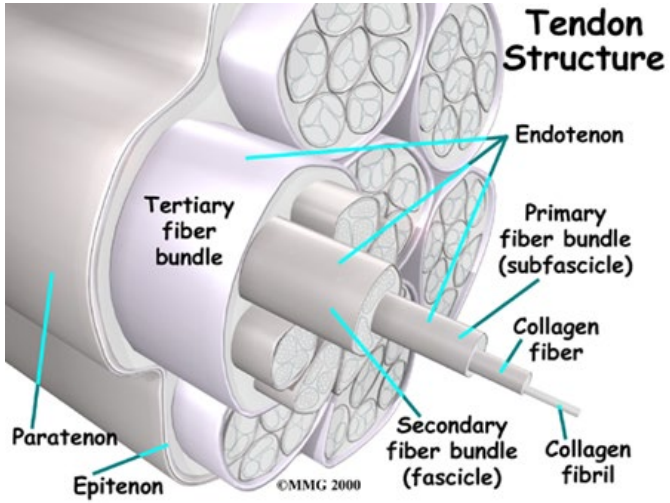
T2.1 – Sample preparation and imaging

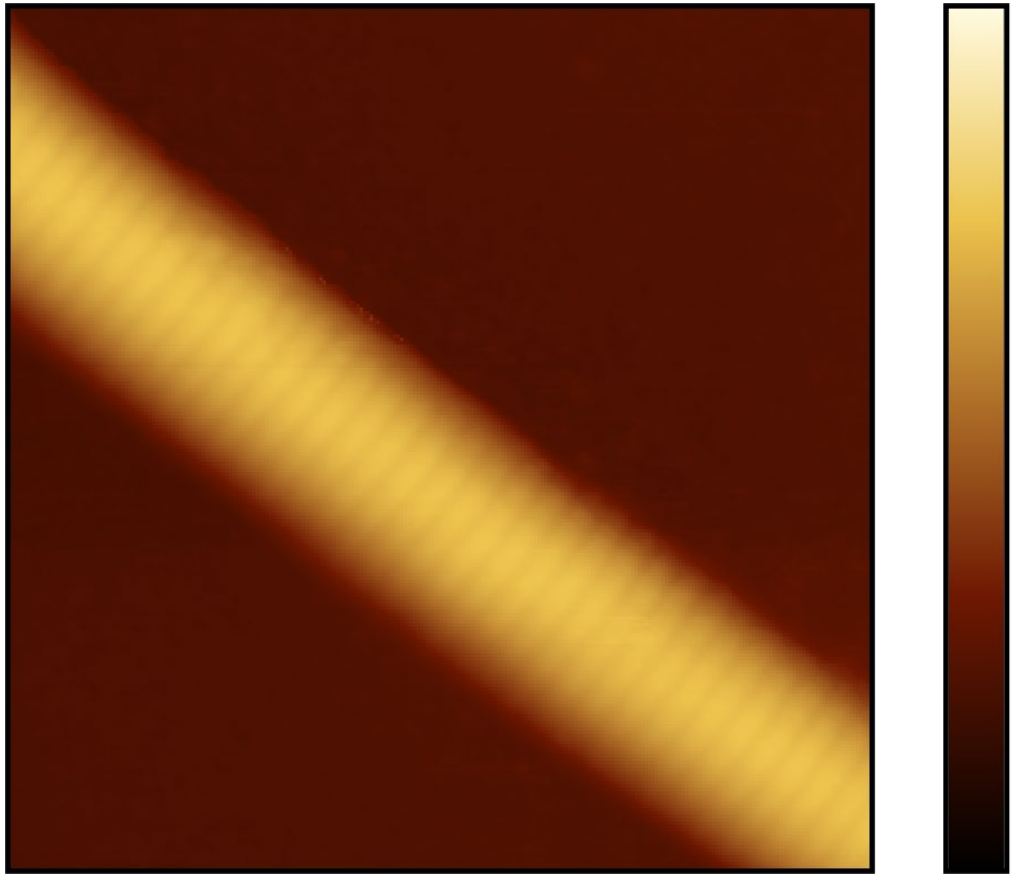
2.1.1 Collagen

Material

Rattails, scissors, petri dish, mica on a metal disc, tweezers, scotch tape

- How to prepare a sample on mica
- How to set up the AFM for imaging
- How tapping mode works





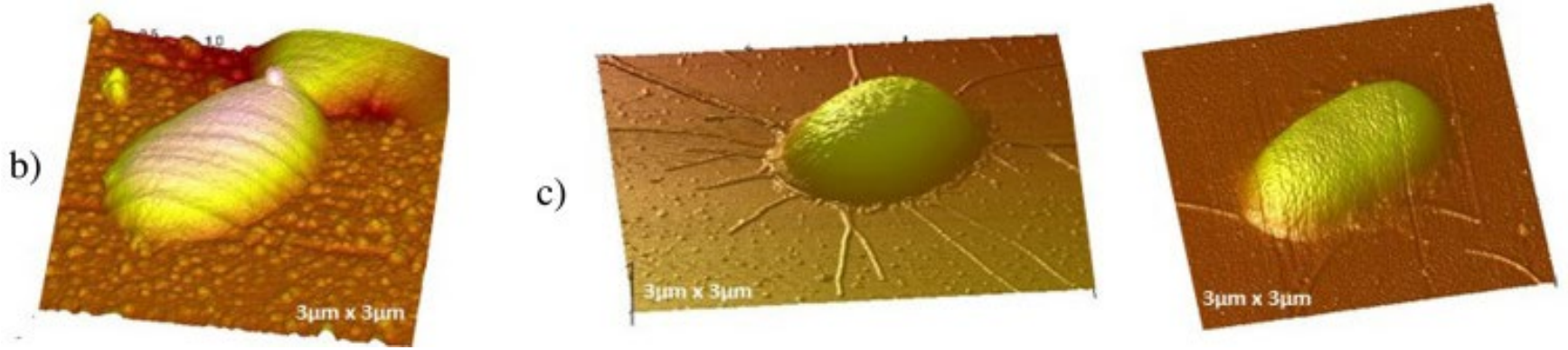
T2.1 – Sample preparation and imaging

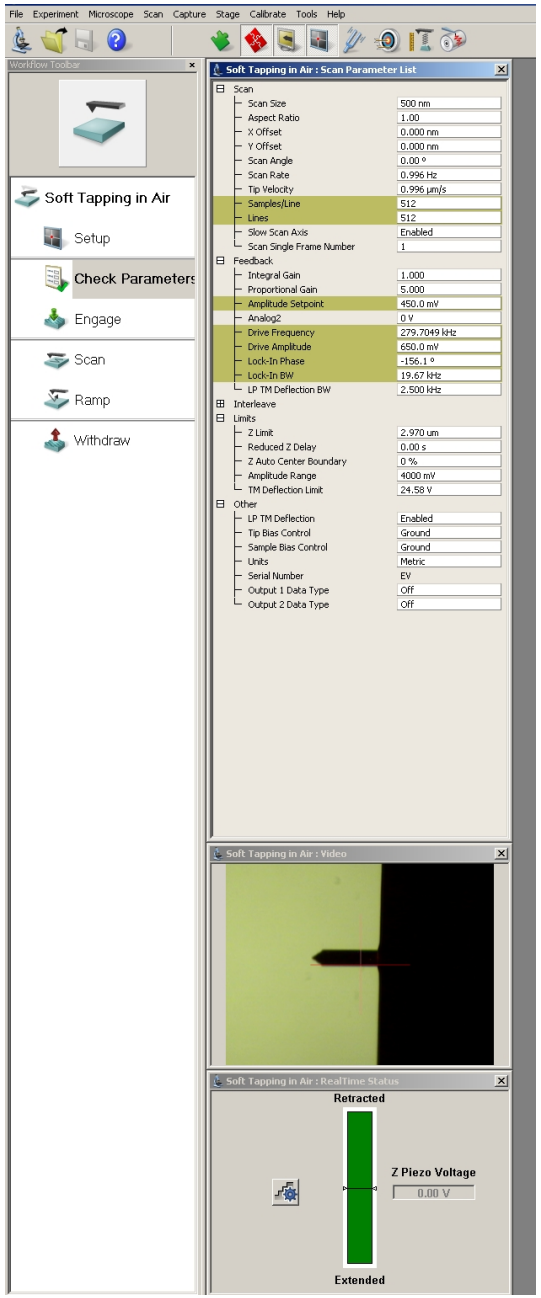
2.1.2 E.coli

Material

Centrifuge, pipette, fresh E.coli, mica

- How to prepare E.coli sample (wet) on mica
- How to optimize Imaging parameters





T2.1 – Sample preparation and imaging

Images to collect:

Collagen

- ❑ 30um x 30um scan at 1024 (samples per line) x 256 (lines)
- ❑ 10um x 10um scan at 1024 x 256
- ❑ 2-4um x 2-4um scan on single collagen fiber 1024 x 256

E.coli

- ❑ 30um x 30um scan at 1024 x 256
- ❑ 1 single E.coli ~5um x 5um at 1024x256

T2.2 AFM image processing and analysis

Software: Gwyddion

Image corrections

- ❑ Line median matching
- ❑ 1st order plane leveling
- ❑ Three-pint fitting
- ❑ Scar correction
- ❑ Higher order leveling
- ❑ …

Image representation

- ❑ Color palettes
- ❑ 3D Data representation

Data analysis

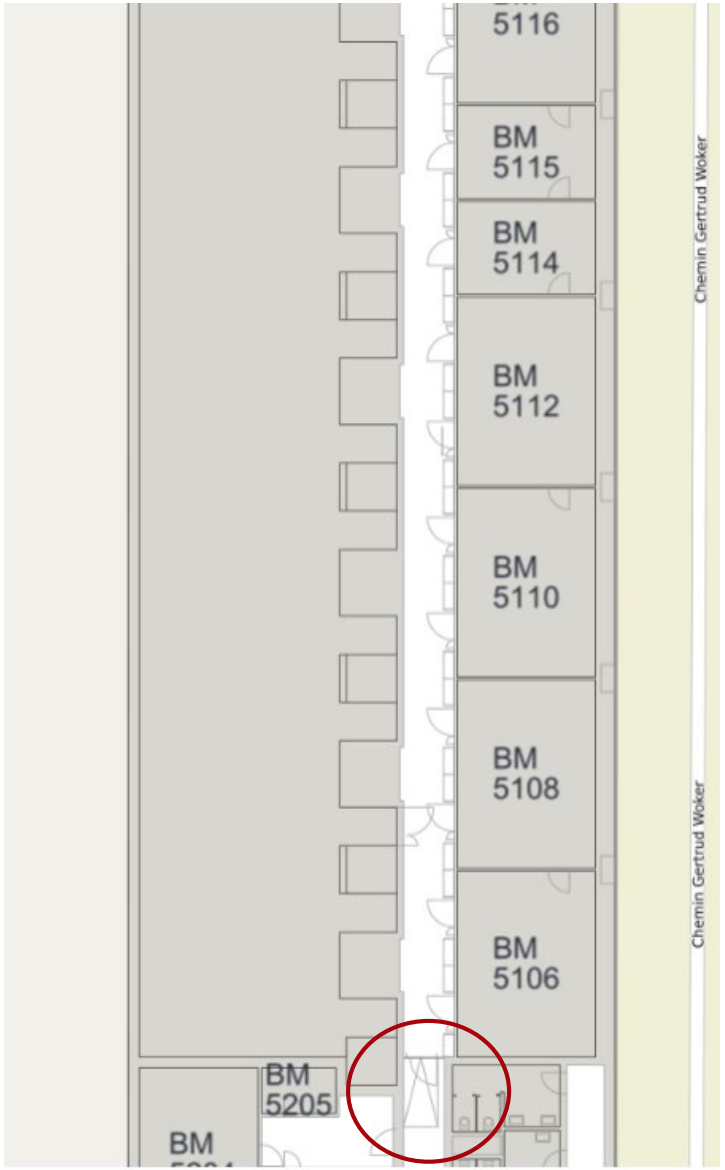
- ❑ Extracting profiles
- ❑ 2D FFT Analysis
- ❑ Tip diameter estimation
- ❑ …

T2.2 AFM image processing and analysis

Task:

- Process all the images you obtained with AFM, print them and put them into your laboratory notebook.
- Analyzing AFM image of collagen fibrils and E.coli bacteria.

Location: BM5114



Thank you