

Setup Instructions for Bruker Dimension FastScan AFM in Albanova Nanolab

2018-03-02

Matthew Fielden



These instructions describe the steps required to safely start and run the FastScan system. More detailed instructions on basic setup as well as some more specific modes and on different instruments are available in video format at <https://play.kth.se/channel/Nanolab/85378671>.

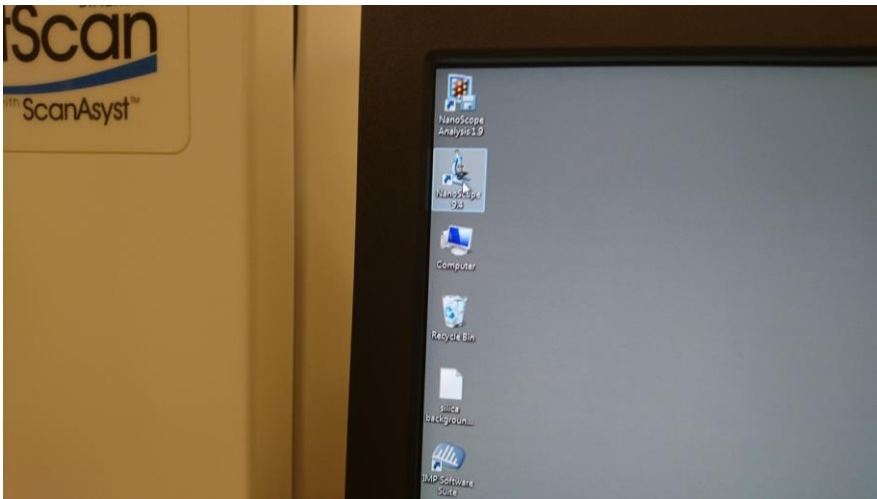
1. Open cabinet left cabinet under desk and turn on computer



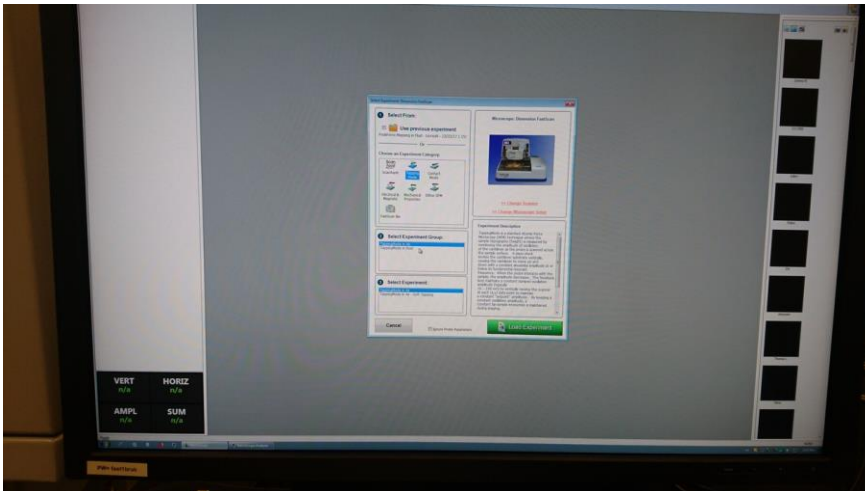
2. Wait for the beep, then start the controller



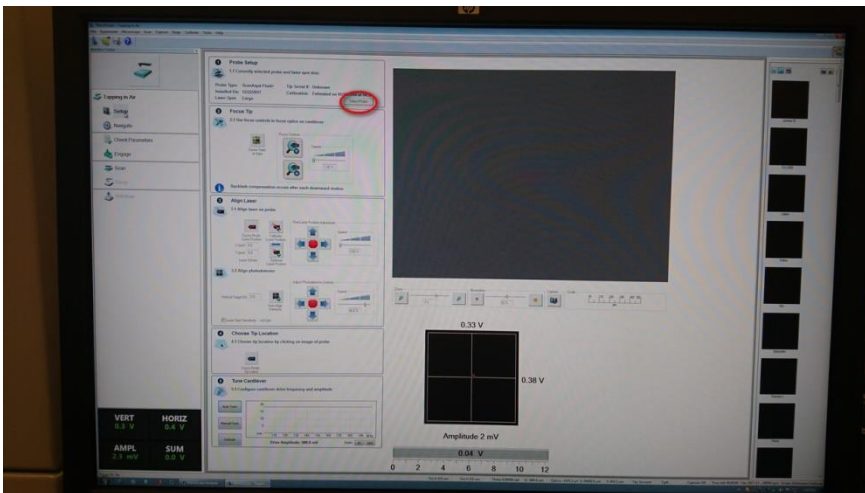
3. Use the Nanoscope login and the password on the screen
4. Start the software via the Nanoscope icon on the desktop



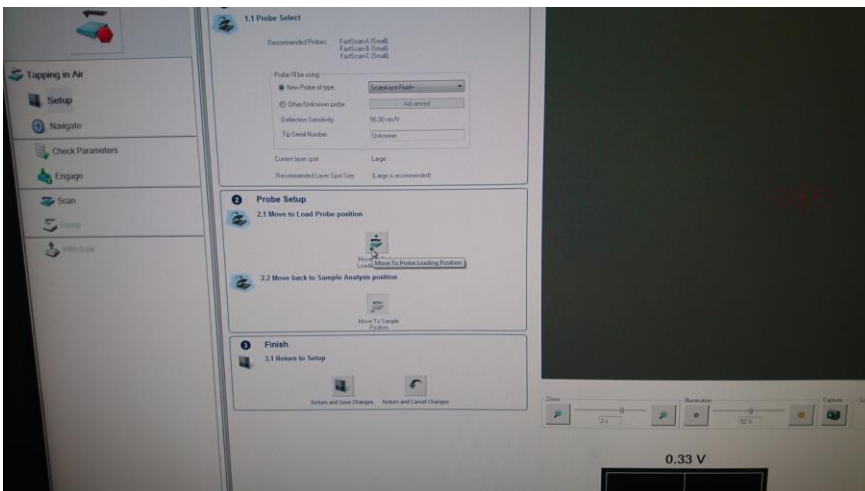
5. Choose a workspace (e.g. tapping mode)



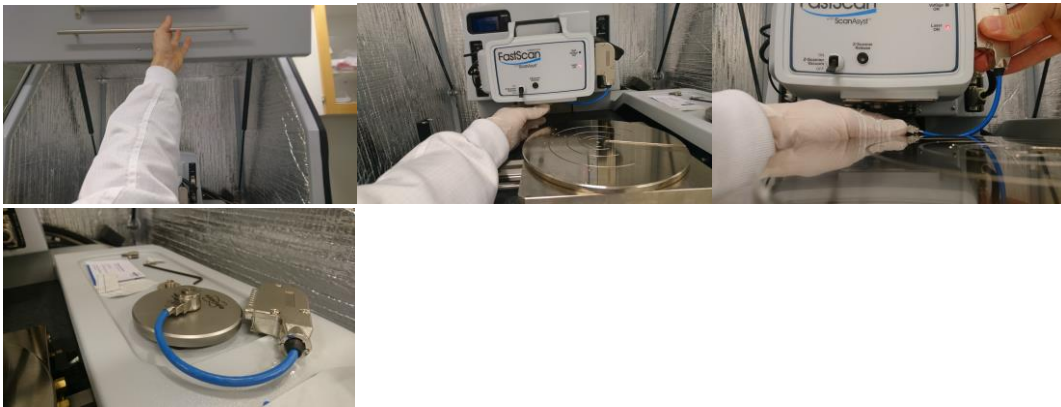
6. Press "Yes" to initialize the stage (takes circa 30s)
7. After initialize, Press "Select Probe" in Setup window (this disables high voltage to the z-scanner and allows removal for probe mounting)



8. Press button to move to probe loading position



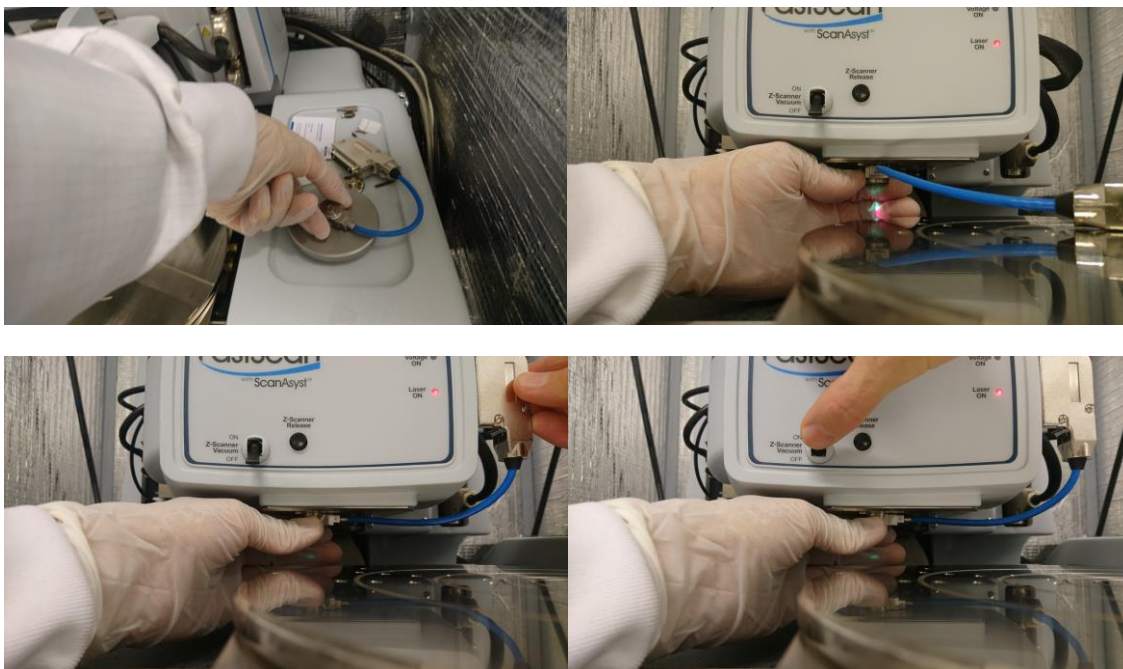
9. Open hood and remove z-scanner from xy-scanner



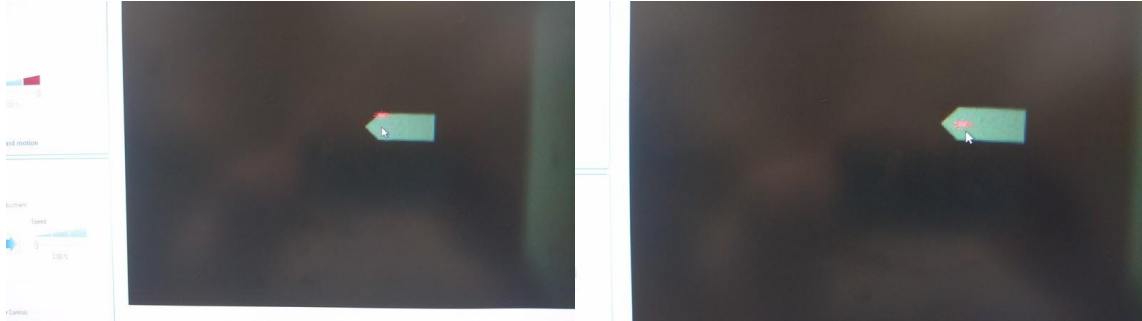
10. Move scanner to stereoscope for probe mounting. Be careful with the clip – it is easily bent..



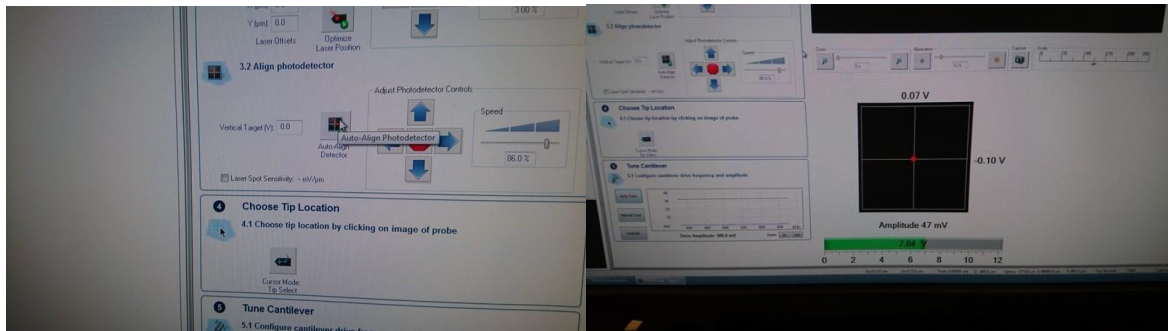
11. Attach scanner and turn on vacuum (pick up scanner with hand upside down)



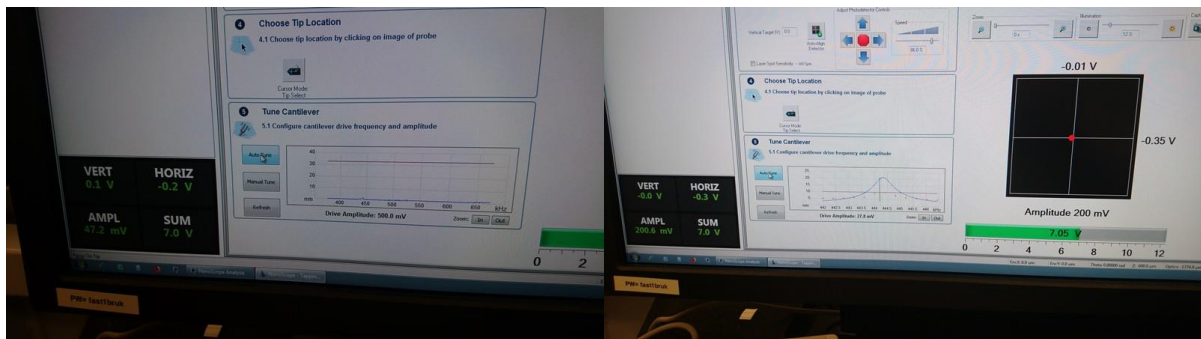
12. Cantilever should be in the field of view of the camera, but may be out of focus
13. Press “Return and Save Changes” in Select Probe window
14. Adjust light and focus cantilever. Position laser in the middle close to the end of the cantilever by clicking with the mouse on the camera image



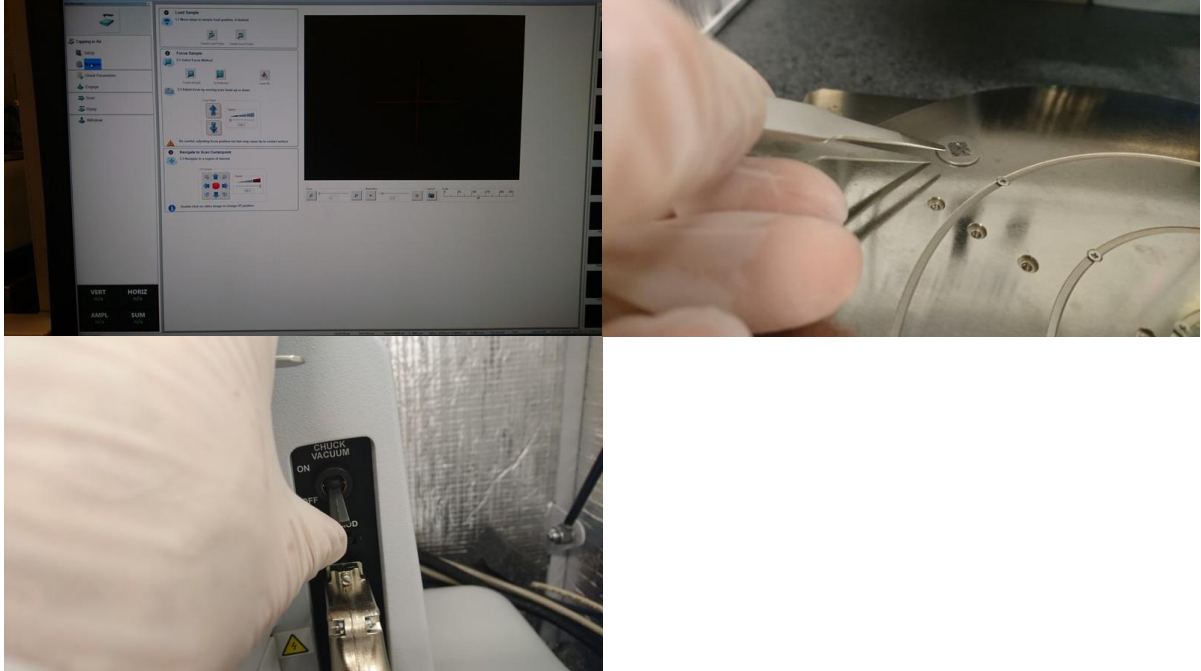
15. Auto-align the photodetector



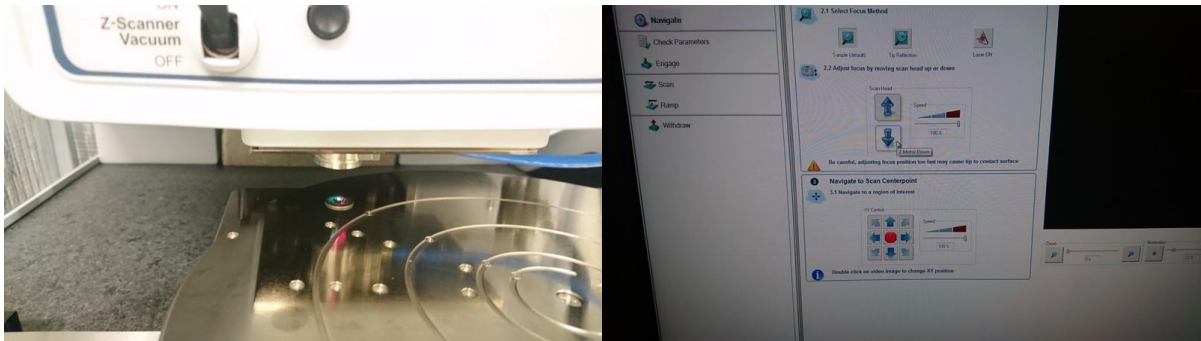
16. Autotune cantilever



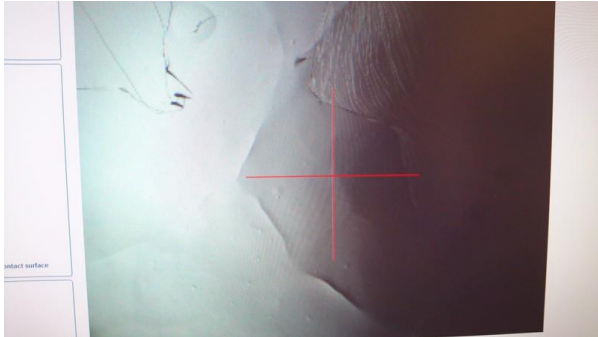
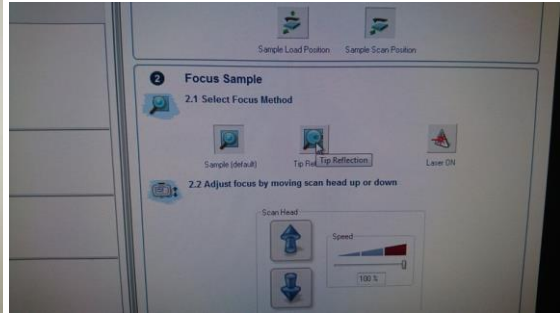
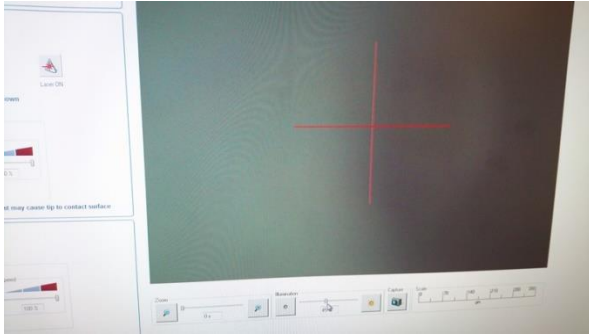
17. Click on “Navigate” in the right-hand menu. If the stage is under the scanner, move it to the front with the arrows at the bottom of the left hand menu. Place your sample on the vacuum chuck. The vacuum line can be recognized by the line of screws. The outermost screw is usually removed, and that is where you should place your sample. Turn on the vacuum. Alternatively, use the magnetic sample holder, but make sure that you lift the scanner enough to provide ample sample clearance.



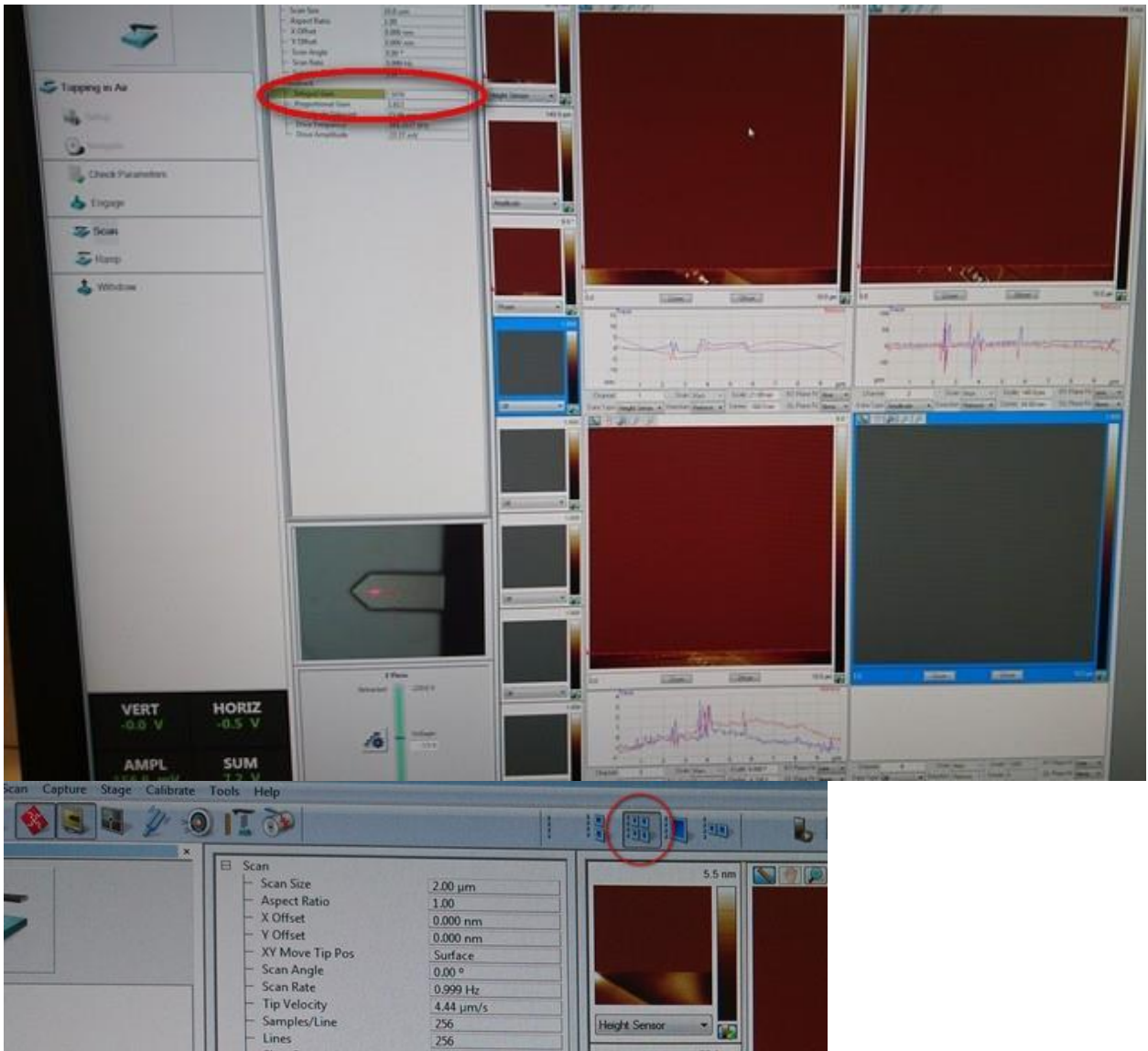
18. Move the stage so that the sample is underneath the scanner using the arrows or the trackball, and lower the scanner towards the sample using the downward arrow



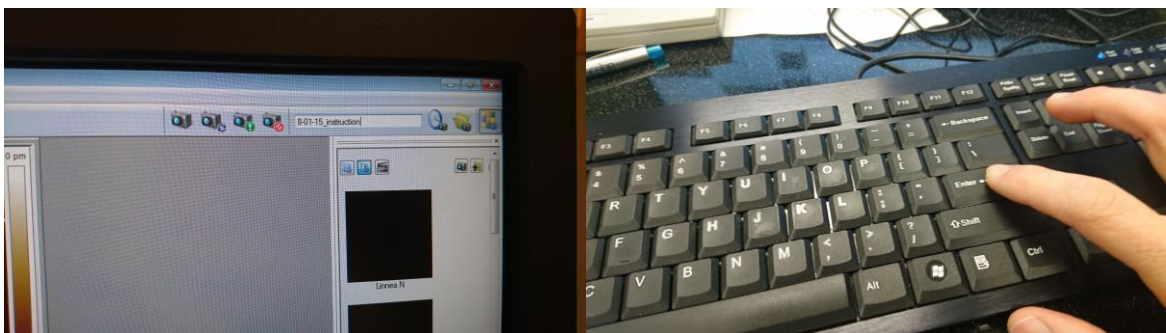
19. Click the “Tip Reflection” button. This allows more space between the probe and sample (x2), minimizing the risk of crashing the tip onto samples that don’t have clear distinguishing optical features. In the worst case, the tip reflection should become visible. In the case below, the surface (HOPG) is clearly visible due to layer edges etc.

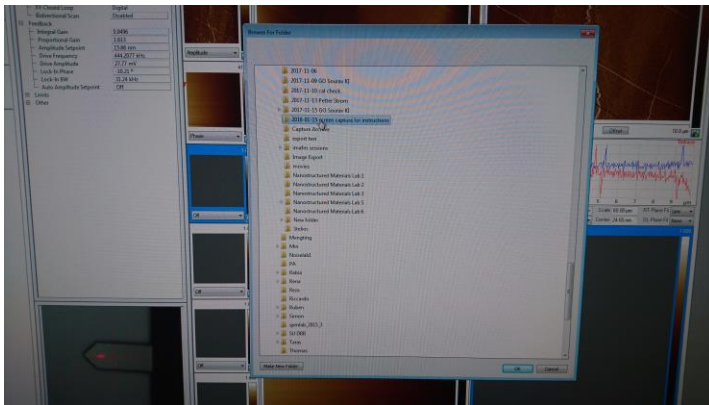


20. Click "Sample" and move the scanner down until the sample surface is in focus
21. Click "Check Parameters" and adjust as necessary (by default, usually not necessary to change anything when you are starting up the measurement)
22. Press "Engage" in the right hand menu
23. Scanning will start automatically. Optimize tracking by increasing gains until instability starts to appear in the amplitude window (if you don't see an amplitude window, press the "four window" button in the top menu row)

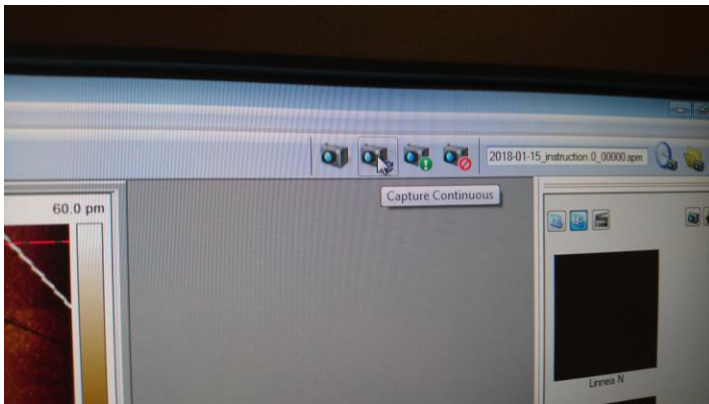


24. Choose a file series name and press enter (otherwise it won't register the name). Choose or create a directory with the folder button (to the right of the folder name)

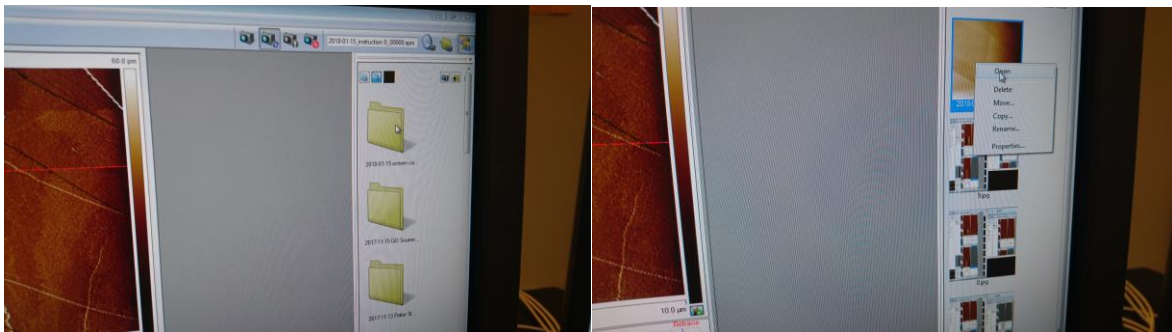


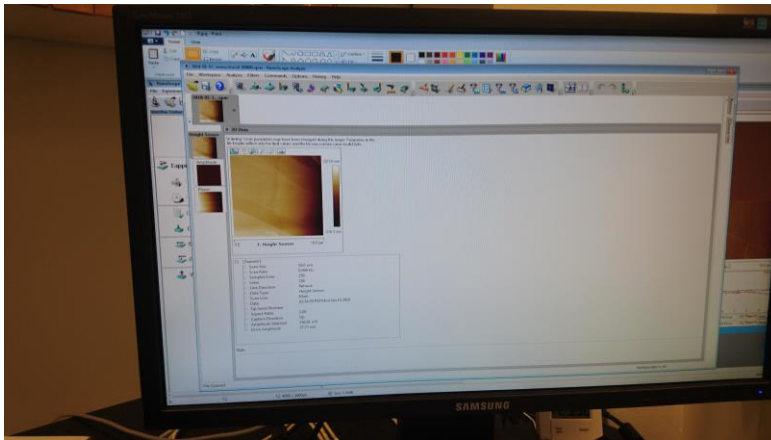


25. Press the capture or capture continuous button to save full images. They will only save if the imaging parameters are left unchanged during the whole scan.

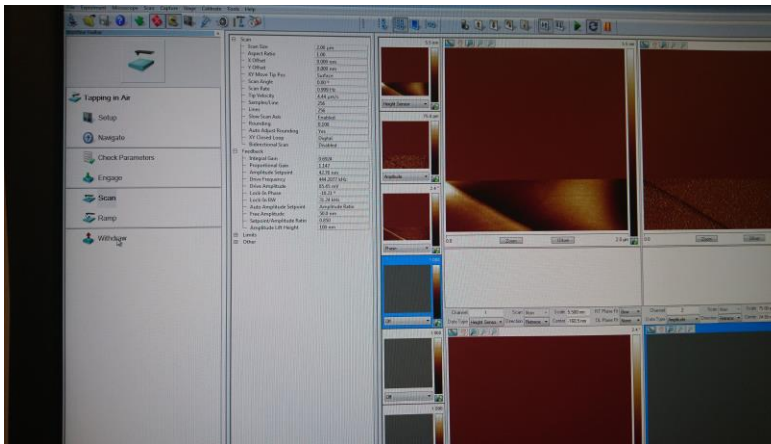


26. Choose the correct directory in the offline viewing area to the right of the screen, and open files in Nanoscope Analysis with right click

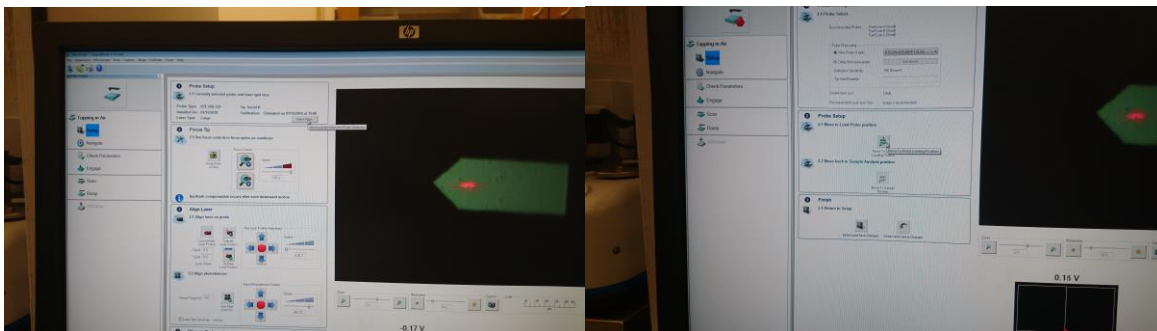


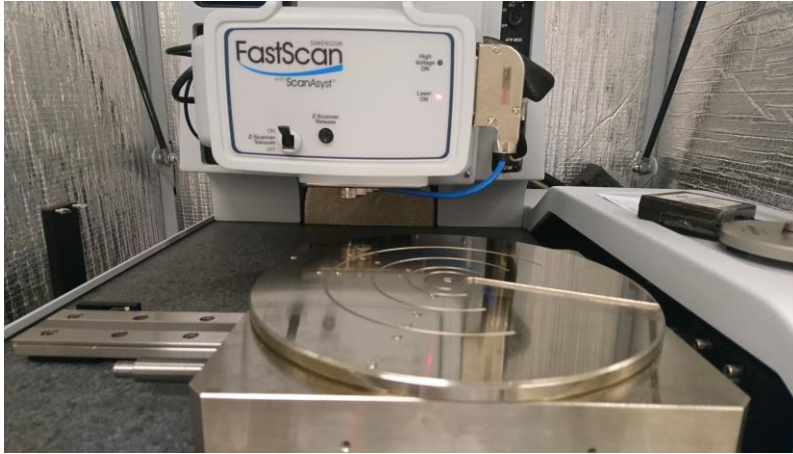


27. When you are done with your measurement, press Withdraw in the left-hand menu



28. Go to Setup menu and press "Load Probe" button. Click on "Move to load probe position"





29. Remove z-scanner, take out probe etc. as for probe mounting (steps 10-12). Remount z-scanner, close "Load Probe" window, and close down software.
30. Switch off controller followed by shutting down computer via Windows menu