

## **MY 5580: Laboratory #1**

### **AFM Training**

**Objective:** To become affiliated with the different components of the Dimension 3000 (Digital Instruments) atomic force microscope (AFM), and learn how to correctly operate this instrument.

**Background:** The AFM is a powerful tool for any field that involves characterizing the surface of a solid material. The most potent capabilities of the AFM are its nanometer scale resolution and its ability to scan nearly all surfaces. To operate the AFM efficiently, the user must become familiar with the many different scanning modes available with AFM. This laboratory will focus on intermittent contact mode, or TappingMode™ AFM. This type of scanning allows very delicate or fine scale structures to be imaged with very little damage from the scanning tip. Most of the topographical imaging performed in our lab, as well as others, is done with TappingMode™.

#### **Training Outline:**

1. Walkthrough of all components in AFM
2. Mounting a probe
3. Powering on the Dimension 3000 and selection of the mode of operation
4. Alignment of a laser beam and adjustment of the photodiode signal
5. Cantilever tune (Tapping mode only)
6. Mounting the sample and bringing it into focus
7. Set-up of initial scan parameters for a TappingMode™ scan and contact mode (**guidelines for operation of AFM are provided separately**)
8. Engagement of the probe on a sample surface and adjustment of scan parameters
9. Image capture
10. Withdraw of the cantilever tip from the sample surface
11. Flattening and saving of the captured image(s)
12. Leaving the software and powering down the AFM Dimension 3000 system properly

**\* There will be no formal report for this laboratory. However, this set-up procedure is very important, so reviewing the guidelines periodically is recommended.**