Asylum Research MFP-3D-Bio Atomic Force Microscope

AFM nanolithography, imaging, force spectroscopy and fluorescence spectroscopy measurements are performed on an Asylum Research MFP-3D-Bio Atomic Force Microscope. This is a high performance state-of-the-art system, which combines molecular resolution AFM imaging with very high force sensitivity (pico-N), and with the power of fluorescence imaging. By using an inverted optical microscope (Nikon Ti-E) as the AFM stage the instrument allows to correlate AFM topography/force mapping with fluorescence with high precision and accuracy. The MFP-3D-BIO provides the highest sensitivity and most accurate images and measurements possible on an inverted optical platform. The closed loop nanopositioning sensors on all three axes ensure distortion-free images on samples as small as proteins and as large as cells – in both air and liquid.

The AFM is also equipped with a fluid cell, a petri dish sample holder and a bioheater. Biological samples (biomolecules and/or cells) are kept in their optimal environment (culture medium, CO2 concentration, temperature etc.) during the AFM and fluorescence experiments.

Chemical Fume Hood and Sample Preparation Areas
Facilities for protein synthesis and cell culture

The scientific environment at Tufts fosters synergy and collaboration among investigators, and state-of-the-art laboratories are maintained as core facilities. For example, we are using a protein processing core lab and cell culturing labs, which are a part of the NIH-sponsored P41 Resource Center on Tissue Engineering at Tufts. We are also using an extensive range of analytical equipment, part of the Biophysical Characterization and Protein Chemistry labs at Tufts. We are collaborating with Prof. David Kaplan, Prof. Peggy Cebe and Prof. Fiorenzo Omenetto for our work on protein dynamics and neuronal growth.