Discher Lab Equipment and Capabilities

André Brown
Veeco Multimode AFM

Primarily for single molecule mechanical measurements.

Can also be used for contact mode imaging.

Relatively low noise, uses relatively small samples (~1 cm diameter disks), operation in closed fluid cell possible.
Asylum MFP 1D

Primarily used for surface and cell mechanical measurements

Long z-range for high samples like cells. Light microscopy for finding sample region of interest or characterizing sample optically. Cannot image with AFM.
Asylum MFP-3D

Can be used for mechanical probing of single molecules, surfaces, and cells, contact and AC AFM imaging in air and fluid. Temperature control. Optical microscopy: phase contrast, epi-fluorescence, and multi-color total internal reflection fluorescence.
Hybrid Fluorescence-AFM
Correlation of height and intensity data from two modalities.

Probing and simultaneous monitoring of deformations.
Micropipette Aspiration

Mechanical measurements of cells, vesicles, or nuclei with simultaneous fluorescence monitoring

Mechanical measurements on soft samples that do not need to be tethered or adhered to a surface
HPLC / Fraction collector

In combination with mass spec, used to identify labeled peptides in samples. Enables “Cysteine shotgun” analysis of biological samples including cells.

Analyze the unfolding of the full range of proteins inside cells
Fitting some methods together

Assess bulk vs. single molecule cysteine exposure using TIRF/AFM

See local increases in labeling using AFM to stretch cells and microscopy to monitor bound dyes
Miscellaneous other skills

Cell culture and associated techniques
Polymer synthesis
Hydrogel engineering/analysis
RNAi delivery systems/encapsulation