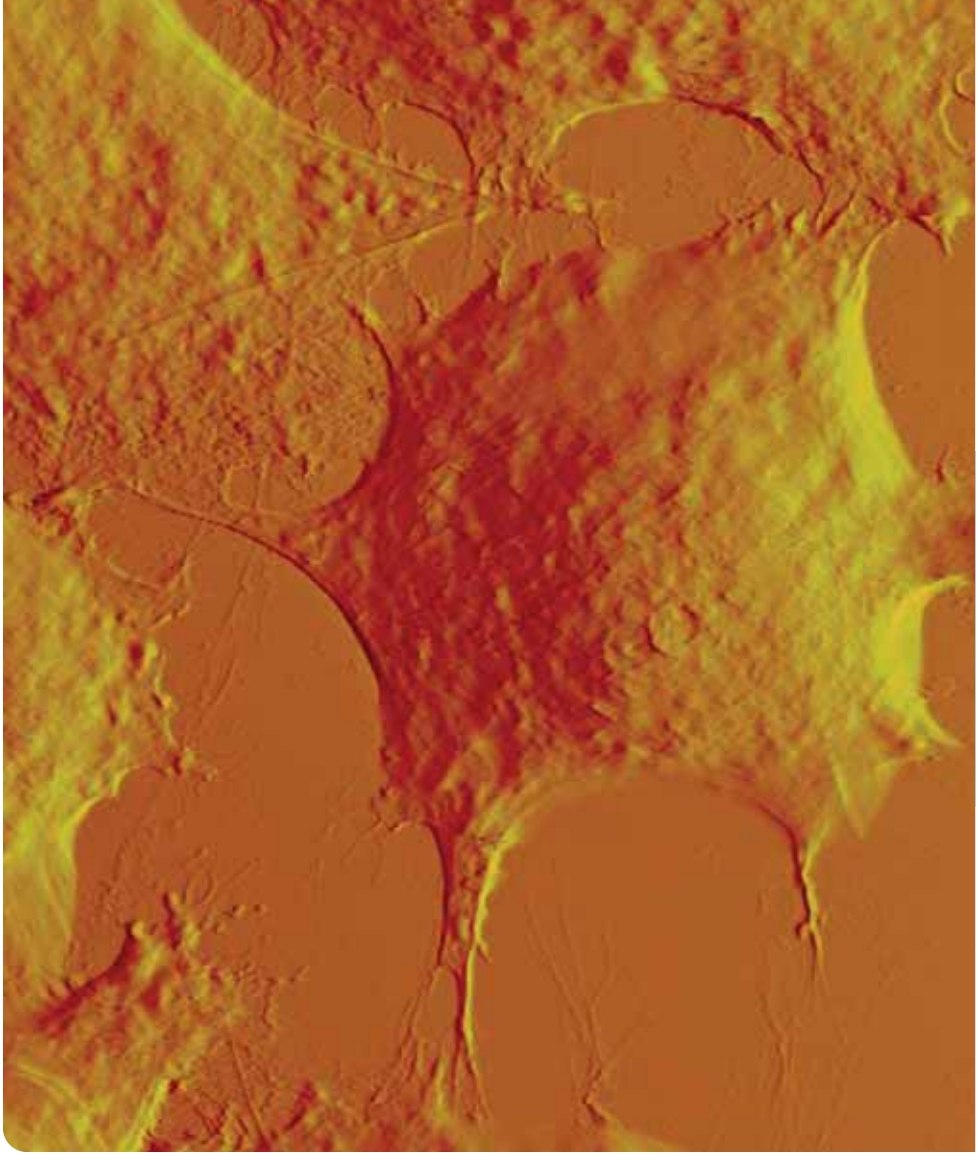
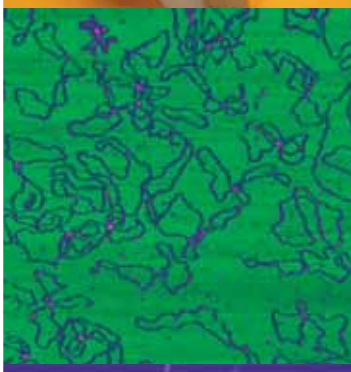
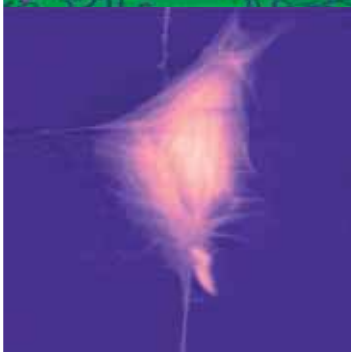






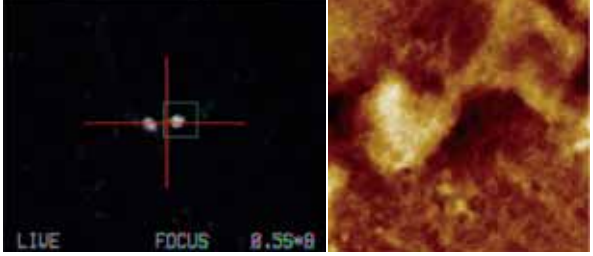
diBioScope II AFM

Enabling Your Advanced Bioscience Research

- Ultimate Integration of AFM/Optical Microscopy
- State-of-the-Art Controller for High Quality Data
- Versatile and Easy-To-Use
- World Leading Service and Support

Veeco

Solutions for a nanoscale world.™



Fluorescence used to identify amyloid plaques (Thioflain-S) in Alzheimer's diseased brain tissue. Area imaged by AFM outlined by green box in fluorescence image. Scan size 60 µm and Z-scale = 2.5 µm

diBioScope II

The BioScope™ II atomic force microscope (AFM) has been engineered specifically to facilitate advanced bioscience research. This remarkably versatile instrument enables AFM imaging under a broad range of dynamic and biologically relevant conditions. The ergonomic design of the BioScope II makes it easy to use in conjunction with today's most powerful commercial inverted optical microscopes, including confocal and TIRF systems, thus providing researchers with quality data and broad biosample compatibility.

Unsurpassed optical access

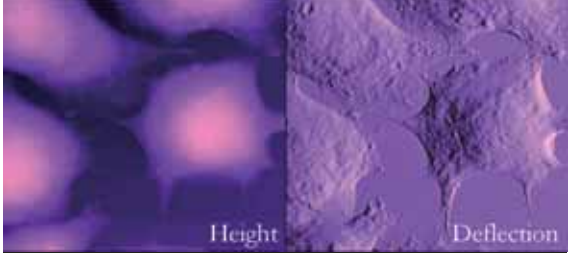
- Flexible integration of AFM with optical techniques; transmitted light including brightfield and advanced fluorescence such as CLSM, TIRF, and FRET

Industry-leading controller

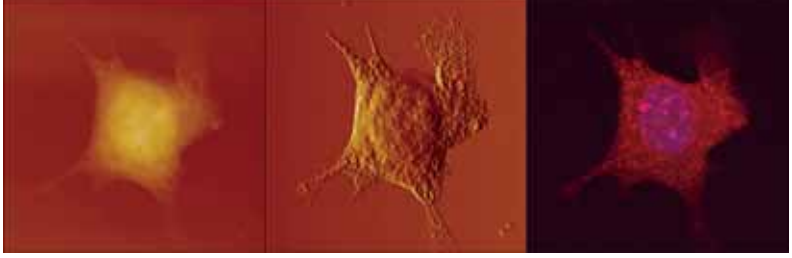
- High pixel density imaging capabilities (5120 x 5120 pixels) eliminates the need to rescan at progressively higher resolutions
- Eight independent data channels allow simultaneous monitoring and acquisition of multiple sample properties

EasyAlign accessory

- Permits unique visualization of IR laser
- Streamlines cantilever replacement and laser alignment



Mouse Fibroblast L-cell. Scan size 60 µm x 60 µm and Z-scale = 13 µm. Cells courtesy of Nate Bouxsein and Professor Cyrus Safinya, USCB, CA



Correlated AFM/CLSM imaging of cells provides information on both surface (AFM) and internal (CLSM) cellular structures. Imaging in buffer solution; 63x oil immersion objective. Scan size 65 µm and Z-scale = 8 µm

DESIGN BREAKTHROUGH FOR BETTER PERFORMANCE

The BioScope II AFM is ideal for a wide array of cutting-edge bioscience applications, such as spatial identification of protein molecules and cellular structures, investigations of cell response to mechanical stimulation and in-situ pharmacological studies of live cells.

The open, ergonomic design of the BioScope II scanner head allows uncompromised use of brightfield, darkfield, phase contrast and DIC optical microscopy with condensers up to 0.55NA. The AFM sample stage accommodates high-magnification objective lenses, including water and oil immersion objectives, such that optical functionality is not compromised. Furthermore, the open physical access to the area surrounding the AFM tip and sample allows easy addition/exchange of imaging fluids, as well as the potential for introduction of mechanical probes, without interfering with the optical pathway.

Experimental setup is simplified by a set of enhanced "ease-of-use" features, including a motorized stage and automated approach mechanism for accurate tip-sample alignment. Veeco's unique EasyAlign™ accessory streamlines cantilever replacement and laser alignment.

BROAD DYNAMIC RANGE FOR RESEARCH

The BioScope II XY-scanning sample stage provides a dynamic range of scan sizes. To permit imaging of taller biological structures, such as cells, the BioScope II offers a Z range greater than 15µm. Meanwhile, an X-Y range that exceeds 150µm lets users better match cell/sample size to scan area and easily correlate AFM data with optical/fluorescence images. With low-noise, closed-loop scanning capabilities in all three-axes, the BioScope II allows accurate offsetting to features of interest.

OPTICAL/AFM TECHNIQUE INTEGRATION

While the BioScope II can be operated as a stand-alone AFM system, it can also be integrated with a number of more advanced optical techniques, such as epifluorescence, CLSM, TIRF, FRAP, and FRET. These types of "multimodal" imaging platforms provide a powerful approach for yielding in-situ correlated information on the structure-function relationship of biomolecules and biological processes. A standard IR super-luminescent diode is utilized for deflection detection, effectively eliminating interference with common red-emitting biological fluorophores.

ADVANCED CONTROLLER TECHNOLOGY

The next-generation BioScope II controller increases AFM functionality, bandwidth, flexibility, and expandability. As many as eight user-defined data channels can be displayed and acquired simultaneously in real-time with unprecedented signal-to-noise ratio. Easy access to analog and digital inputs and outputs allows for customized experimental setups ideal for the integration of optical microscopy and AFM data. High-pixel-density images, up to 5120 x 5120 pixels, help eliminate the need to rescan samples at progressively higher resolutions and preserves sample integrity. In addition, the controller utilizes the thermal-tune method to simplify fluid operation and accurately determine the tip spring constant.

SUPERIOR ENVIRONMENTAL CONTROL

Fast, simple instrument setup improves time-to-results and greatly reduces sample degradation. For studies requiring a more physiologically related environment, the BioScope II offers a "soft-sealed" perfusion ring. Combined with a magnetically held condensation window, the soft-sealed cell affords control of the liquid/chemical environment, as well as the gaseous environment above the sample, thereby enabling long-term imaging of oxygen- or pH-sensitive samples such as anaerobic cell types. This soft-sealed environment reduces evaporation in order to facilitate imaging of self-assembly processes and molecular interactions in real-time.

A fluid heating stage (RT to 60°C) with thermistor feedback is also available for the BioScope II. This stage easily replaces the standard sample stage and can be used alone or in combination with the perfusion cell to maintain live cell samples. It also enables the study of thermally activated processes such as crystal formation/dissolution and lipid membrane phase transitions.

APPLICATION FLEXIBILITY

- Spatial identification and mapping of protein molecules and cellular structures
- Lipid membrane composition and reorganization events
- Optically guided imaging of cell surfaces using transmitted light microscopy
- In-situ pharmacological studies on live cells
- Cell response to mechanical stimulation
- Real-time observation of cell signaling events

Veeco Probes offers the world's largest selection of AFM probes and accessories for bioscience applications. For our full list of probes and accessories, please contact us at 1-800-715-8440.

			Experiment		AFM Mode	
Sample Type	Probe Family/Model		Liquid	Air	Tapping	Contact
Biomolecules (nucleic acids, proteins, lipids, carbohydrates, etc.)	Silicon	OTESPA	—	x	x	—
		RTESP	—	x	x	—
		TESP	—	x	x	—
Biomolecules (nucleic acids, proteins, lipids, carbohydrates, etc.)	Silicon nitride	(D)NP-S	x	—	x	x
		NP-STT	x	—	x	x
		OTR4	x	—	x	x
Cells	Silicon nitride	(D)NP	x	—	x	x
Tissues	Silicon	TESP	—	x	x	—
Tissues	Silicon nitride	(D)NP	x	—	x	—
		(D)NP-S	x	—	x	—

BIOSCOPE II SPECIFICATIONS

X-Y Scan Range: ≥150 microns

Z Range: ≥15 microns

Stage: Motorized X-Y sample stage;10 mm x 10 mm range

Noise: 0.1nm RMS in vertical (Z direction) in ambient environment (with appropriate vibration isolation); 0.2nm RMS in vertical (Z direction) fluid (with appropriate vibration isolation)

X-Y Sensor Noise: 5 nm RMS

Deflection Detection: 850 nm super luminescent diode (SLD) with EasyAlign Accessory for SLD-cantilever alignment

Standard Sample Holders: 60 mm petri dish; 50mm glass-bottom petri dish; 35mm petri dish; 1"x 3" glass slide; 25mm coverslip

Cantilever Holder: Tapping/contact mode air holder; Tapping/contact mode fluid holder

Removable/customizable sample chuck

Inverted Optical Microscope: Zeiss Axiovert 100, 135, and 200; Olympus IX70, 71, and 81; Nikon TE2000

Top-down optical access: Fully compatible with most off-the-shelf condensers, up to 0.55 NA

Open physical access to tip/sample

Environmental Control: Optional heating (RT – 60°C); optional soft seal perfusion

Thermal tune cantilever spring constant calibration: Up to 2MHz

Controller Electronics: BioScope II Controller

Power Requirements: 1800W, single-phase, 115V or 230V, 50 or 60 Hz, dedicated circuit

Note: Performance specifications are typical and subject to change without notice.

Veeco
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1-800-873-9750
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B59, Rev A0, 8/06

Worldwide Customer Support from the Industry Leader

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