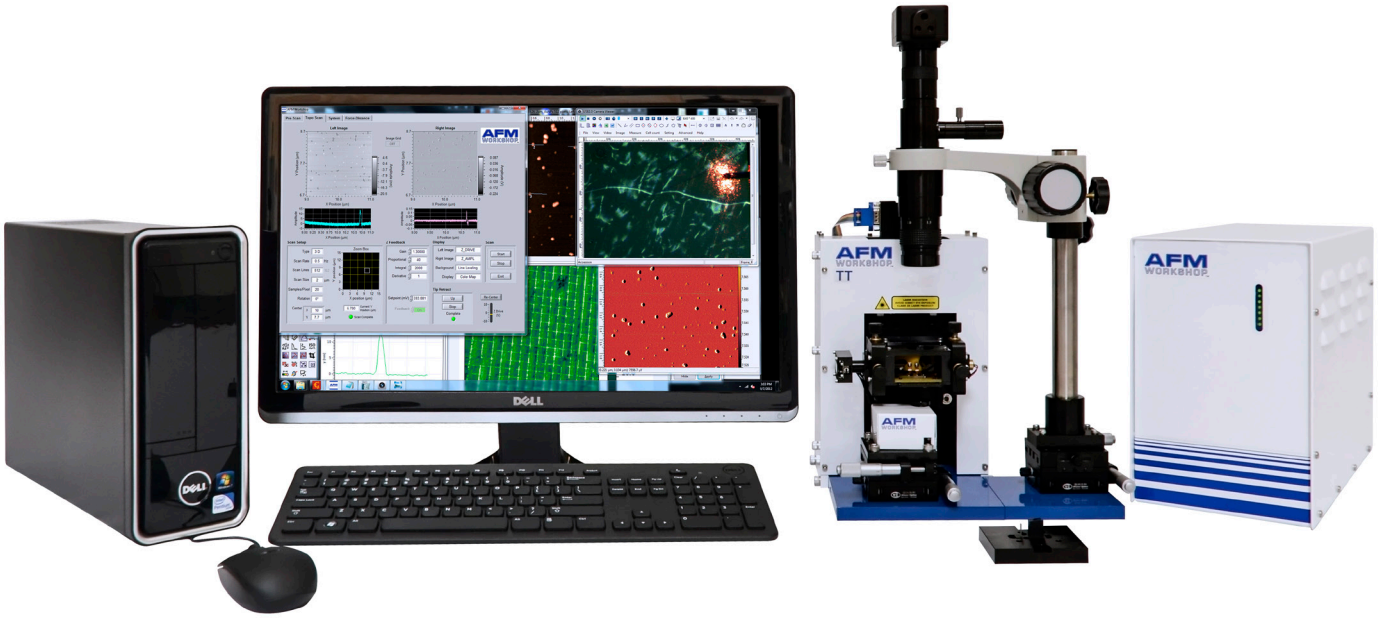
TT-AFM
Kit Assembly Workshop



Attendees to this **FIVE-DAY WORKSHOP** build their own atomic force microscope and learn how to operate it. Additionally, daily seminars provide attendees with training on the theory, operation and applications of an atomic force microscope.

Each day begins with one to two hours of coursework followed by hands-on microscope assembly and testing.

Attendees of the TT-AFM Kit Assembly workshop:

A **Are better able to operate**, gain optimal performance, and obtain the best images from their AFM.

B **Can repair the microscope** whenever needed because they know the assembly process and all the parts used in its construction.

C **May easily modify their instrument** to create unique instrumentation designed for their specific research applications.

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THE AGENDA

for the **5 day TT-AFM Kit Assembly Workshop**

MONDAY

Morning

Introduction to Atomic Force Microscopes: This 1.5 hour seminar includes the history of AFMs and explains why they are unique instruments that have enabled major innovations in nanotechnology. Detailed animations help present the operating principles of an AFM.

Afternoon

Assemble AFM Subcomponents: The video optical microscope and Ebox are assembled, and the assembly of the xyz Piezo scanner begins. AFM Control software and video microscope software are loaded on to the system's computer.

TUESDAY

Morning

AFM Design: Key design elements of the AFM are presented. This includes the rationale for selecting mechanical as well as electrical components in the AFM. A detailed explanation of light lever alignment follows.

Afternoon

AFM Operation: Each step required for gaining images from the AFM is discussed. This includes sample preparation, instrument setup and SPM Control software operation.

The AFM light lever and the xyz Piezo scanner are assembled and tested. These assemblies are then integrated into the AFM stage. By the end of the day the entire microscope is assembled and ready for testing.

WEDNESDAY

Morning

AFM Image Artifacts: As with any microscope, AFMs can produce unwanted artifacts within images. This morning's talk covers the most common image artifacts as well as their source. Examples of each type of artifact are presented.

Afternoon

Misc. Topics: Topics covered in this seminar include probe selection, imaging in controlled environments, AFM scanning modes, and the factors required to establish AFM image resolution.

Final adjustments to the Light Lever Force Sensor are made and the instrument is fully functional. Much of the day is spent troubleshooting with the system to ensure that the AFM is fully functional and working in both vibrating and non-vibrating modes.

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THE AGENDA

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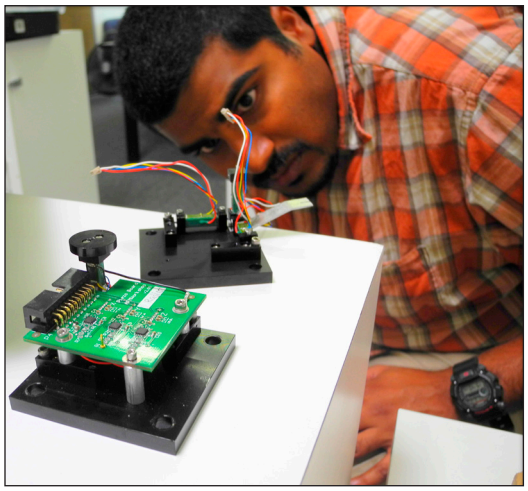
continued...



THURSDAY

Morning

Gwyddion image analysis software: After an AFM image is captured, the TT-AFM uses Gwyddion software to process, display and analyze the image. The key functions of Gwyddion software are presented and demonstrated on an AFM image.

High Resolution Scanning with an AFM: The techniques that must be used to achieve image resolutions below 1nm are presented. This includes control of external vibrations, using the correct probe, optimizing scan parameters, and achieving a good probe approach.

Afternoon

System Certification: This brief presentation covers the performance standards that are required to certify the AFM before it is shipped.

Attendees master measuring images in topography modes, learn to calibrate the AFM, and learn to measure LFM and phase images. Additionally, workshop attendees practice the techniques required for high-resolution imaging, such as scanner gain control and probe approach.

FRIDAY

Morning

Open Discussion: Any additional topics attendees wish to discuss are addressed.

The AFM is fully certified to the appropriate standards. Once specifications are demonstrated, the AFM is packaged for shipment.

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