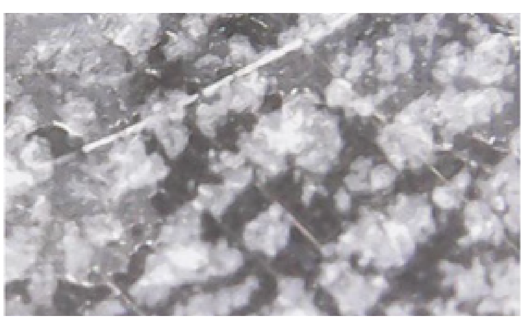
nGauge AFM

Life Science/Biotech

The nGauge Atomic Force Microscope (AFM) can be used in many biotechnology applications. The nGauge AFM operates in tapping mode, meaning the AFM tip is only intermittently in contact with the sample. This allows the nGauge to gather quantitative data about a sample without causing damage to a sample which would occur in contact mode AFM. Furthermore, as the nGauge operates on a benchtop in ambient conditions and due to how it requires very little sample preparation, the nGauge is able to gather information about biological samples in-vivo and without causing extensive damage to the biological sample. This is unlike Scanning Electron Microscopy (SEM), where samples must be completely dehydrated and coated with a metal layer (typically sputtered gold or platinum) or Transmission Electron Microscopy (TEM) where samples typically must be cross-sectioned with a microtome. Furthermore - as a unique property of the nGauge compared to traditional AFMs, it does not require any laser alignment, and can provide nanoscale data within 3 minutes from setup.

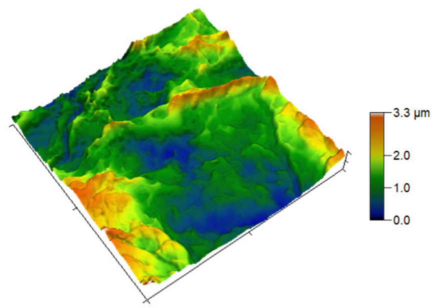
Because of its quick setup and very fast time to data, the nGauge can be used as a complementary technique to other commonly used microscopy techniques such as SEM or TEM. Its high throughput enables rapid screening, lowering costs and saving time.



Skin sample under an optical microscope

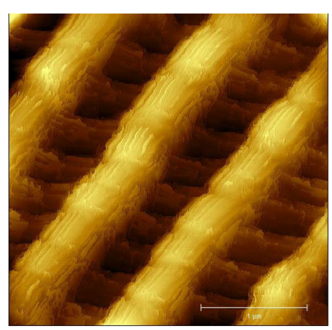
Here, the nGauge was used to look at a skin sample. Under an optical microscope, distinct structures are visible - but it is difficult to tell what structures could be under an optical microscope, as the magnification is very poor compared to the nGauge. An optical microscope image typically has a pixel size thousands of times larger than the pixel size from the nGauge.

Under the nGauge the magnification is greatly increased, which makes nanostructures like keratin fibers and corneocytes clearly visible. This is particularly advantageous because the data gathered by the nGauge is three-dimensional, which allows for a more detailed analysis of the features. It is possible to get 3D data with confocal microscopy, but due to their limited Z-axis resolution of at best about 0.5um, it would only be possible to get ~7 slices/pixels in the z-axis for this sample. In comparison, the nGauge has <0.5nm resolution in z, more than two orders of magnitude better!
This data is useful because it allows inspection for specific nanoscale features in biological samples, for example this information could be used to perform a non-invasive biopsy to check for skin diseases.

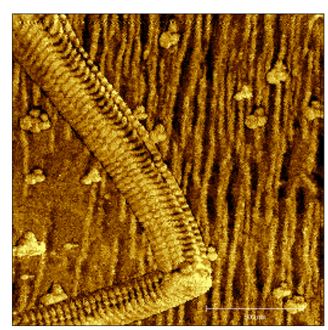


3D image of the skin sample under the nGauge AFM

Similarly, the nanostructures that make up the structural color of a butterfly wing can easily be quantified by the nGauge, enabling research and understanding on various biological organisms.



Butterfly wing under the nGauge



Collagen strand under the nGauge with 67 nm wide bands. Phase image.

Biopolymers such as collagen can also be analyzed with the help of the nGauge AFM, which provides additional information about their structure and arrangement.

Contact info@quantanalitica.com to request a demo

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