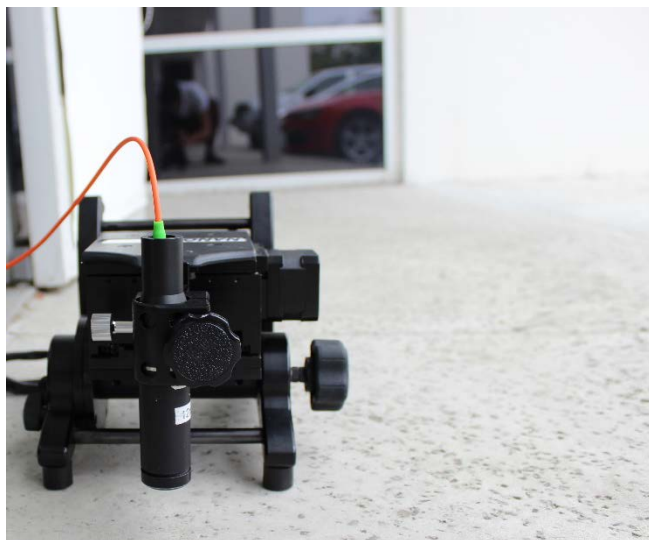


**Portability and Flexibility of the Nanovea JR25  
3D Non-Contact Profilometer**



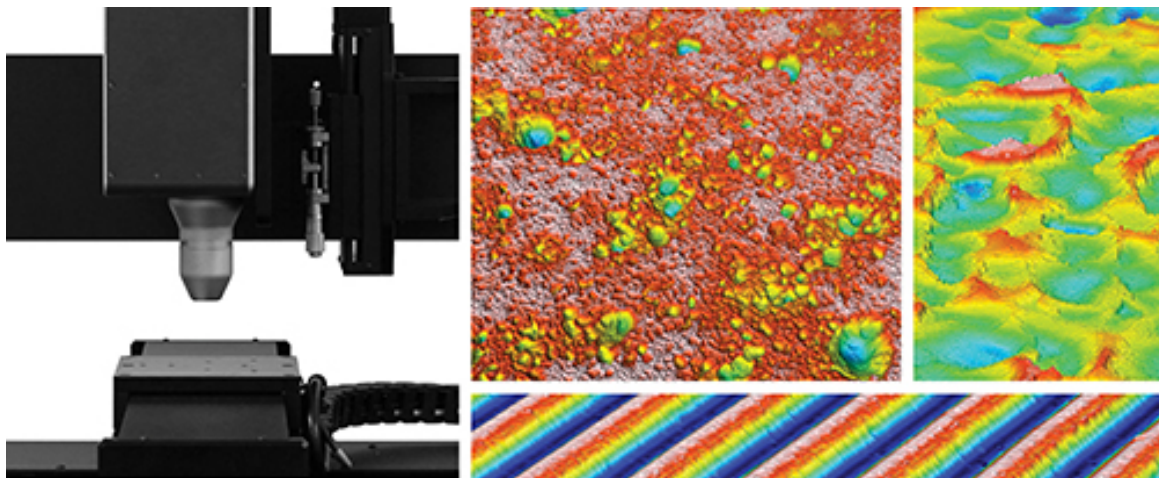
Prepared by  
**Frank Liu**

## INTRO:

Understanding and quantifying a sample's surface is crucial for many applications including quality control and research. To study surfaces, profilometers are often used to scan and image samples. A large problem with conventional profilometry instruments is the inability to accommodate for nonconventional samples. Difficulties in measuring nonconventional samples can occur due to sample size, geometry, inability to move the sample, or other inconvenient sample preparations. Nanovea's portable 3D non-contact profilometers, the JR series, is able to solve most of these problems with its ability to scan sample surfaces from varying angles and its portability.

### **IMPORTANCE OF PORTABILITY AND FLEXIBILITY OF 3D NON-CONTACT PROFILOMETER**

Measurement of nonconventional samples is difficult mainly due to problems mounting the sample onto a stage. For Nanovea's JR25, the sample does not need to be mounted; it just has to remain unmoving. This means large objects such as walls, cars, or machines can be easily scanned. Its compact size makes it portable as well as diverse. It can tilt its pen sensor at an angle which makes it ideal in measuring samples that are not flat and have difficulties exposing its area of interest to a scanning probe. Since the 3D Non-Contact Profilometer uses axial chromatism technology, it can also measure any surface with minimal sample preparation. Nano to macro heights can be measured with zero influence from sample reflectivity, transparency, and curvature. The flexibility and portability of Nanovea JR25 3D Non-Contact Profilometer makes measuring a larger range of samples simpler than compared to conventional profilometers.



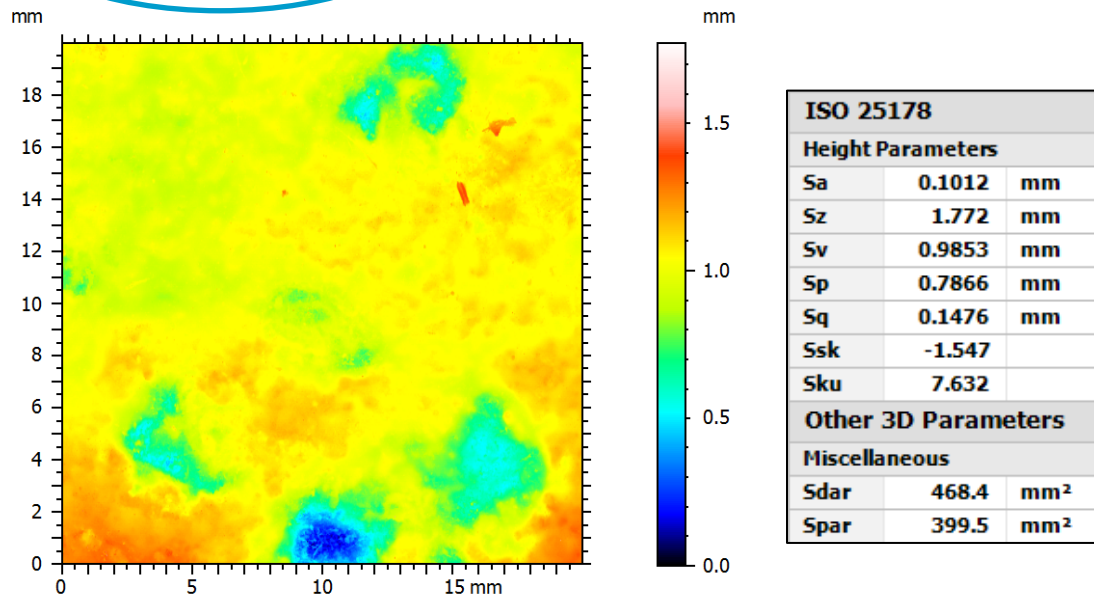
## MEASUREMENT OBJECTIVE

In this application the Nanovea JR25 3D Non-Contact Profilometer was taken outdoors to scan floor concrete and a building wall. This demonstrates the instrument's portability and ability to measure nonconventional surfaces. A tilted sample is also measured to show the ease of measuring samples of different geometries.

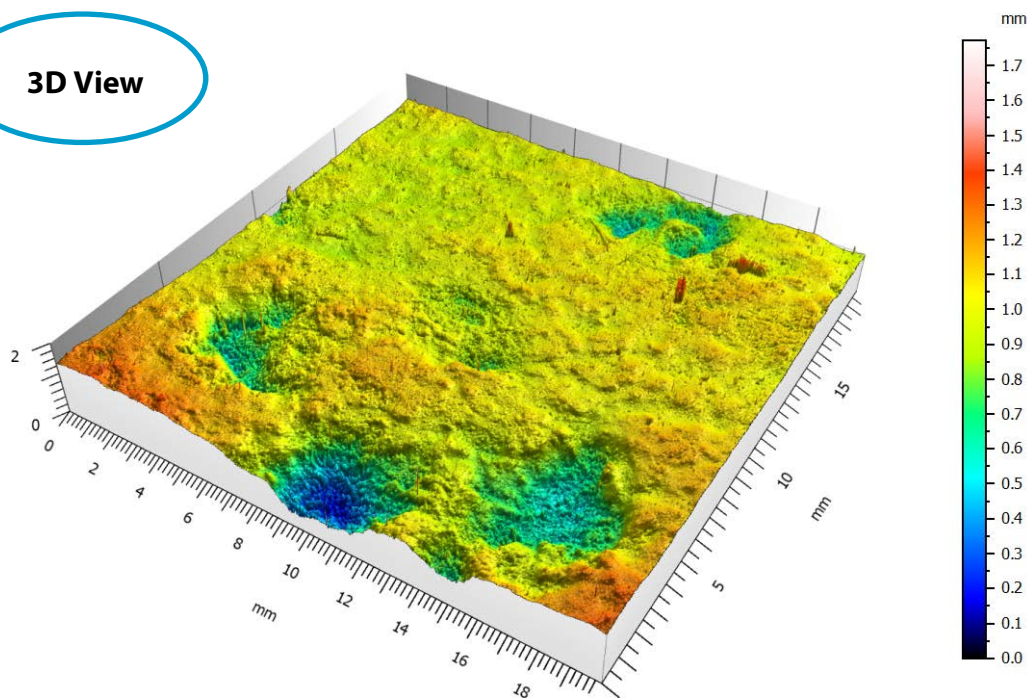
## RESULTS: Concrete Surface

The raw false color view and 3D view of the concrete surface is shown below. Even though the instrument is outdoors, the resolution of the scan is still very high. Almost no noise, whether from the stage or from the environment, can be observed from the data collected.

False Color View & Height Parameters



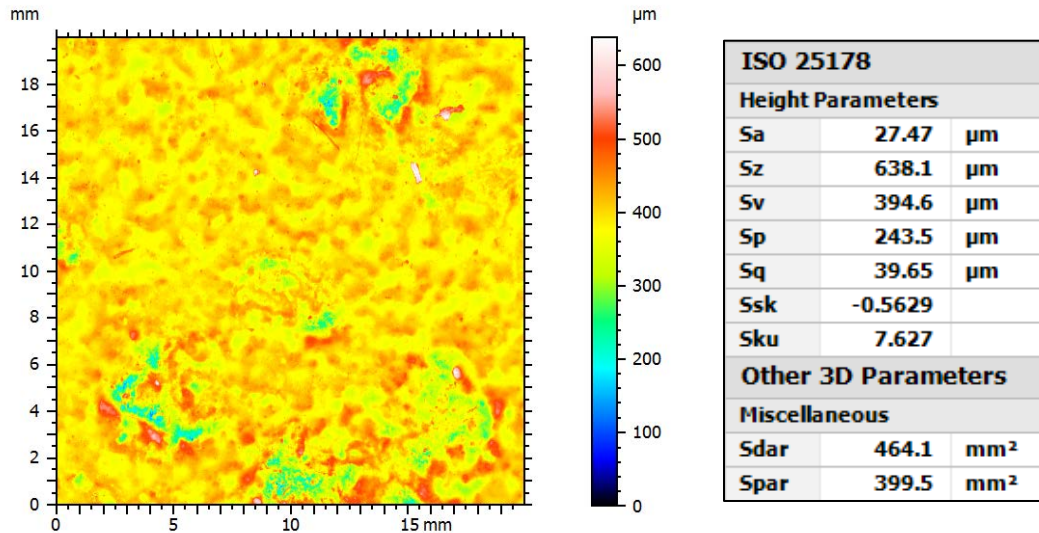
3D View



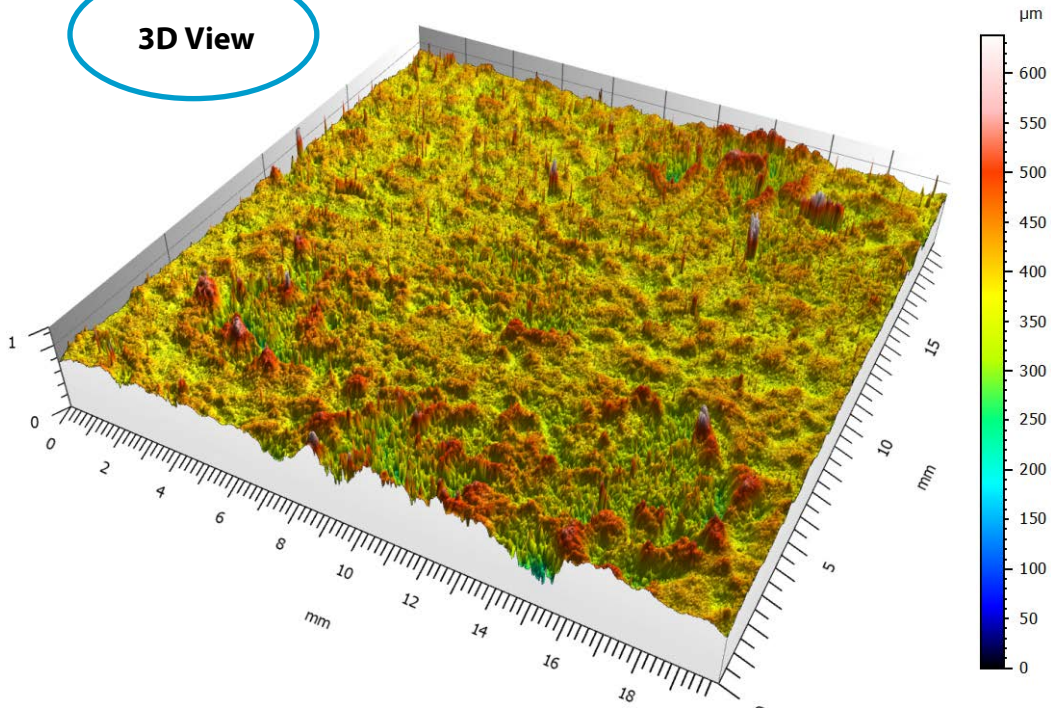
## Concrete Surface Roughness

By applying a filter to the raw scan, the roughness of the concrete surface can be calculated from the same scan. The roughness was calculated after applying a Gaussian filter with a cut-off index of 2.5mm to the surface. The average roughness can be taken from the Sa value of 27.47 micrometers.

### False Color View & Height Parameters



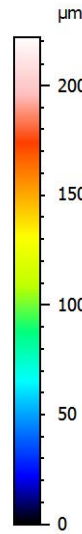
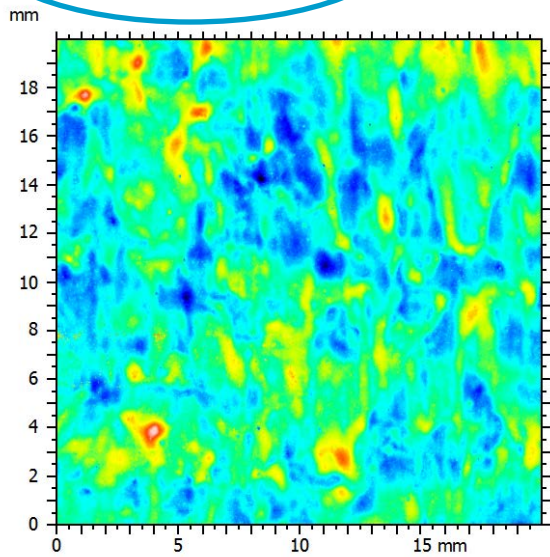
### 3D View



## RESULTS: Wall Surface

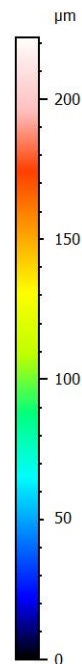
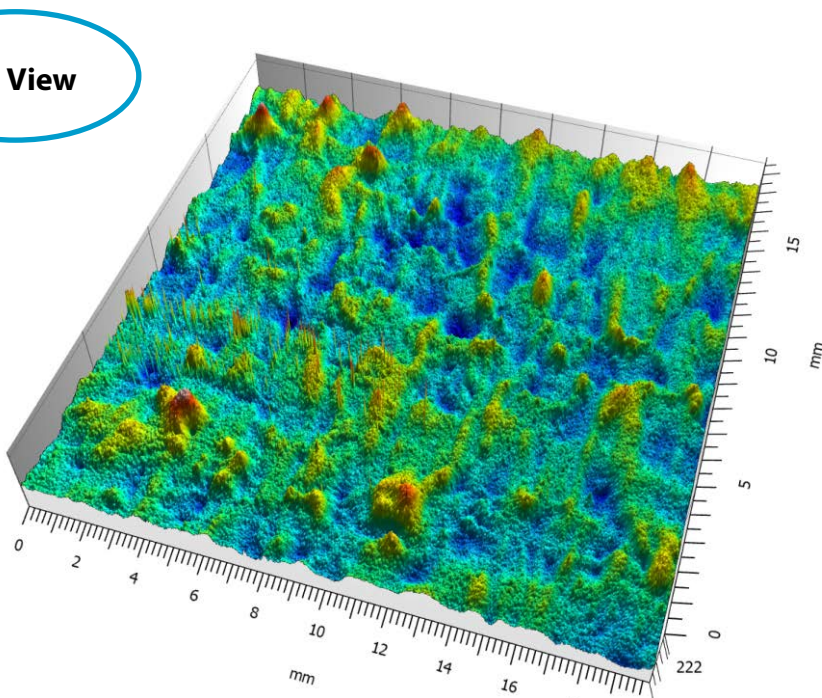
Despite being angled at a 90-degree position, Nanovea's JR25 3D Non-Contact Profilometer is still able to acquire high resolution data. Again, little to no noise can be seen from the scan despite the unique setup of the test. The False color and 3D images shown below are of the raw scan of the wall.

### False Color View & Height Parameters



ISO 25178		
<b>Height Parameters</b>		
Sa	16.81	μm
Sz	222.0	μm
Sv	77.11	μm
Sp	144.9	μm
Sq	21.69	μm
Ssk	0.6786	
Sku	4.327	
<b>Other 3D Parameters</b>		
<b>Miscellaneous</b>		
Sdar	406.3	mm <sup>2</sup>
Spar	399.5	mm <sup>2</sup>

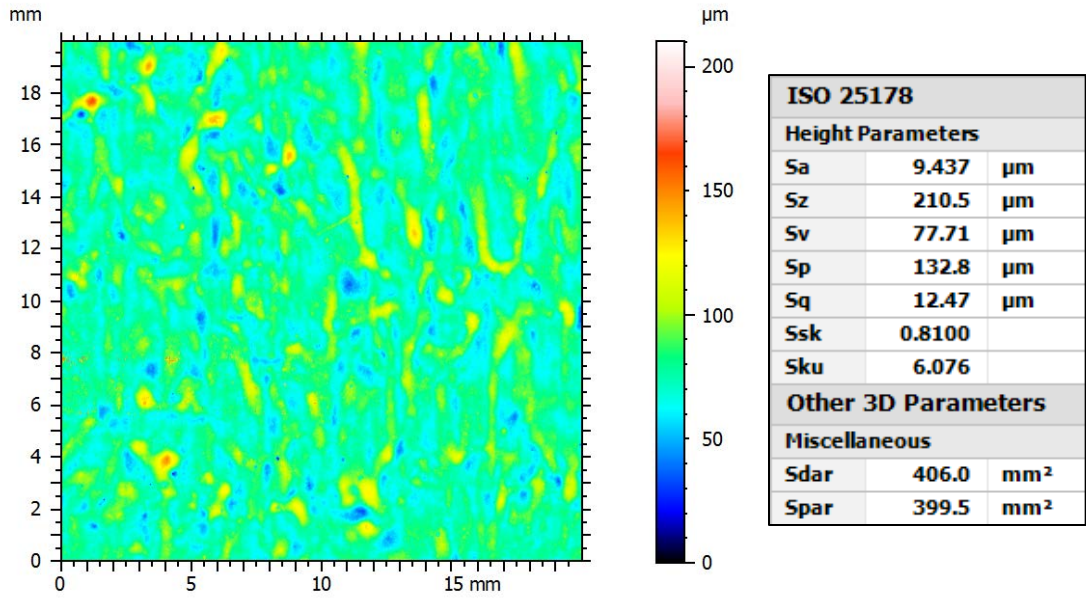
### 3D View



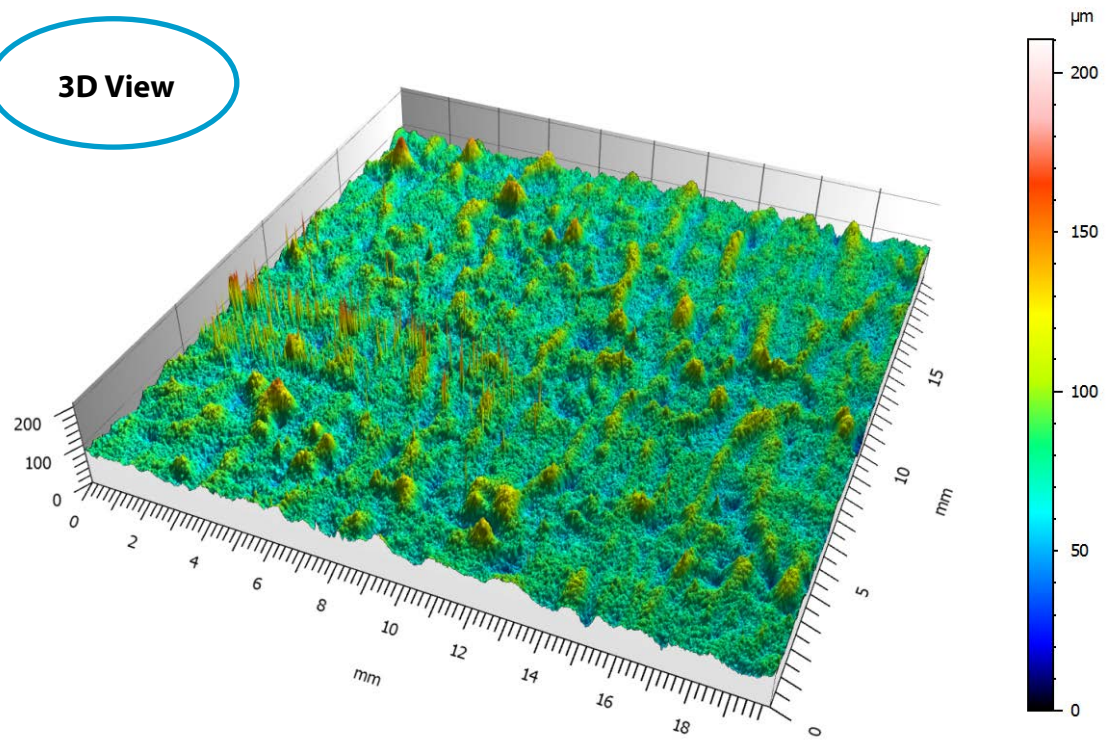
# Wall Surface Roughness

The Wall surface roughness was calculated with a Gaussian filter of 2.5mm.

## False Color View & Height Parameters



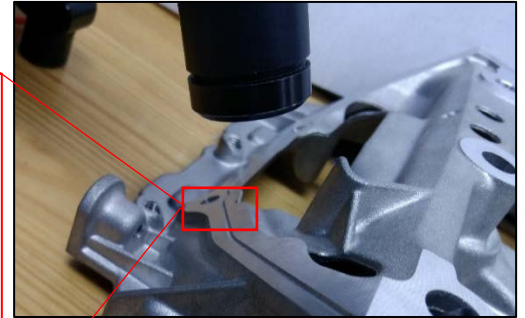
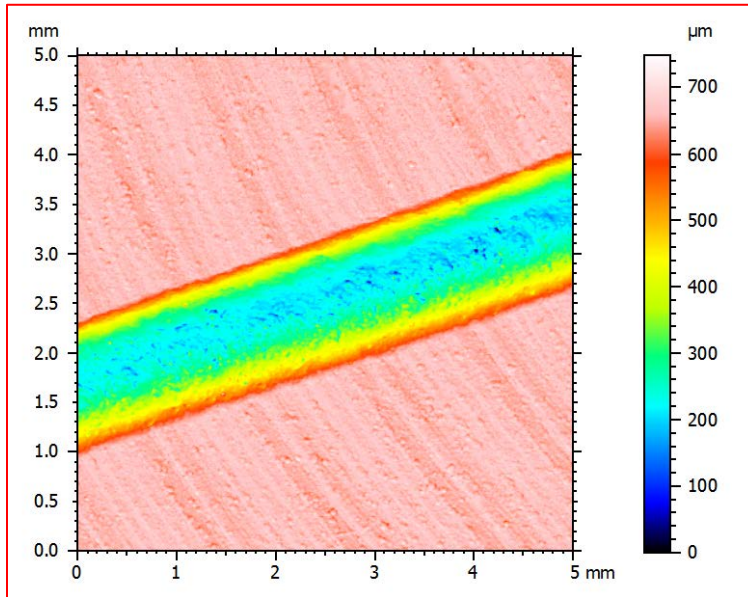
## 3D View



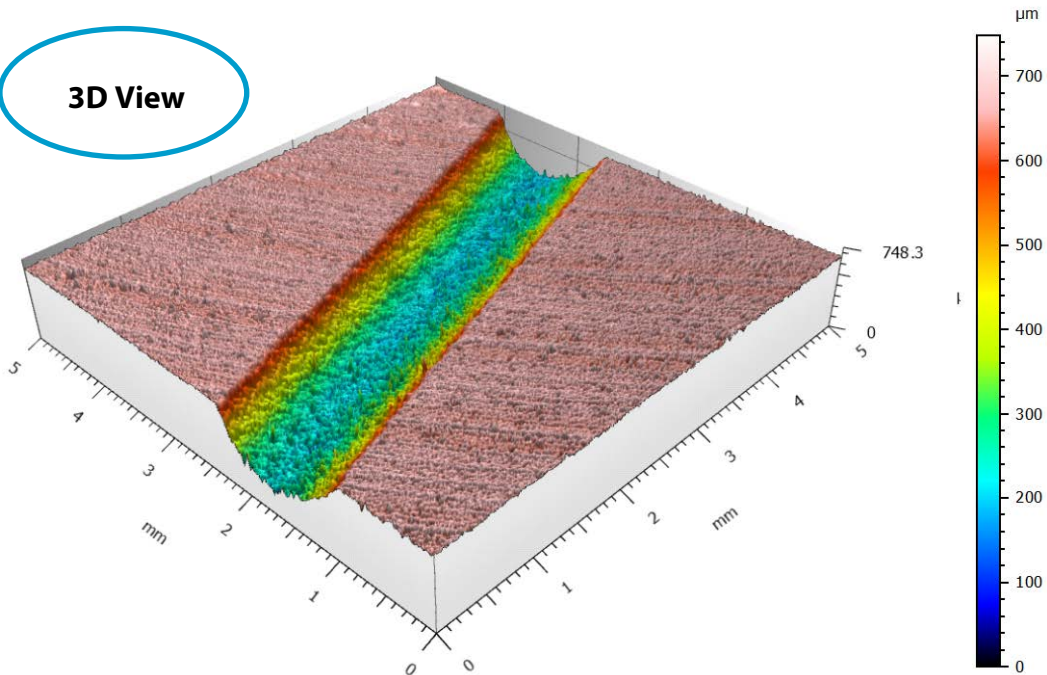
## Tilted Sample

When you combine the JR's ability to tilt its pen sensor and measure angles, the Nanovea JR25 3D Non-Contact Profilometer is able to easily measure vary large samples with complex geometries while still attaining high quality data.

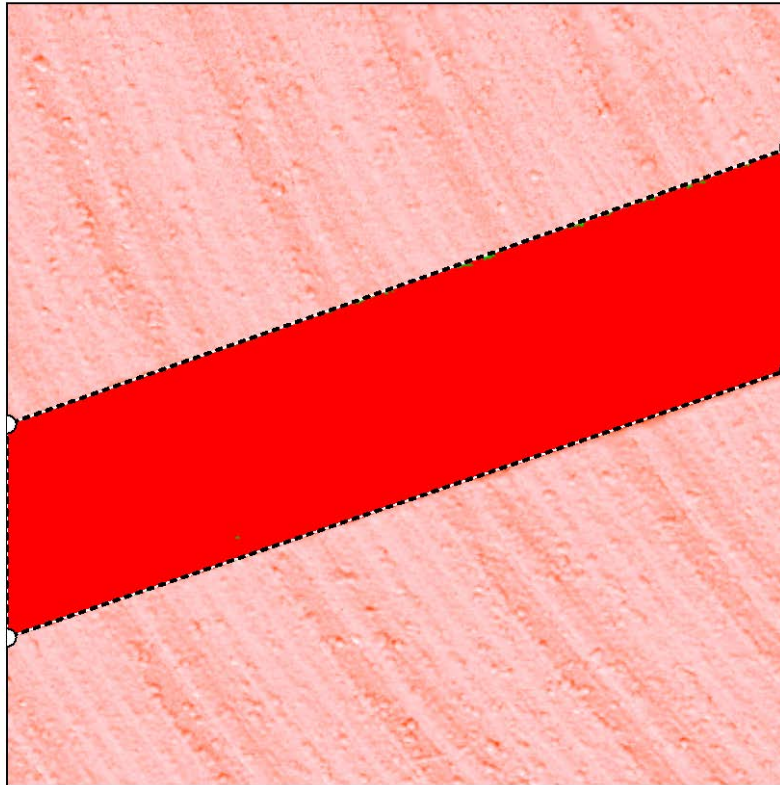
**False Color View**



**3D View**



## Volume of a Hole



Parameters	Unit	Hole
Surface	mm <sup>2</sup>	6.879
Volume	μm <sup>3</sup>	2160264560
Max. depth/height	μm	656.8
Mean depth/height	μm	314.0

### CONCLUSION:

In this application, the Nanovea JR25 3D Non-Contact Profilometer showcases its ability to easily measure samples that are nearly impossible to mount and scan with a conventional profilometer. Its compact size, stage tilt, and ease of use makes it stand out when compared to other profilometer instruments. Despite the unique stage, the resolution and quality of the scans performed is still impressive and does not diminish the accuracy of the results.

Learn more about the [Nanovea Profilometer](#) or [Lab Services](#)