

# Two microscopes are better than one

## Nanoscale Correlative Analysis of Hard to Reach Sample Areas by Combination of AFM and SEM

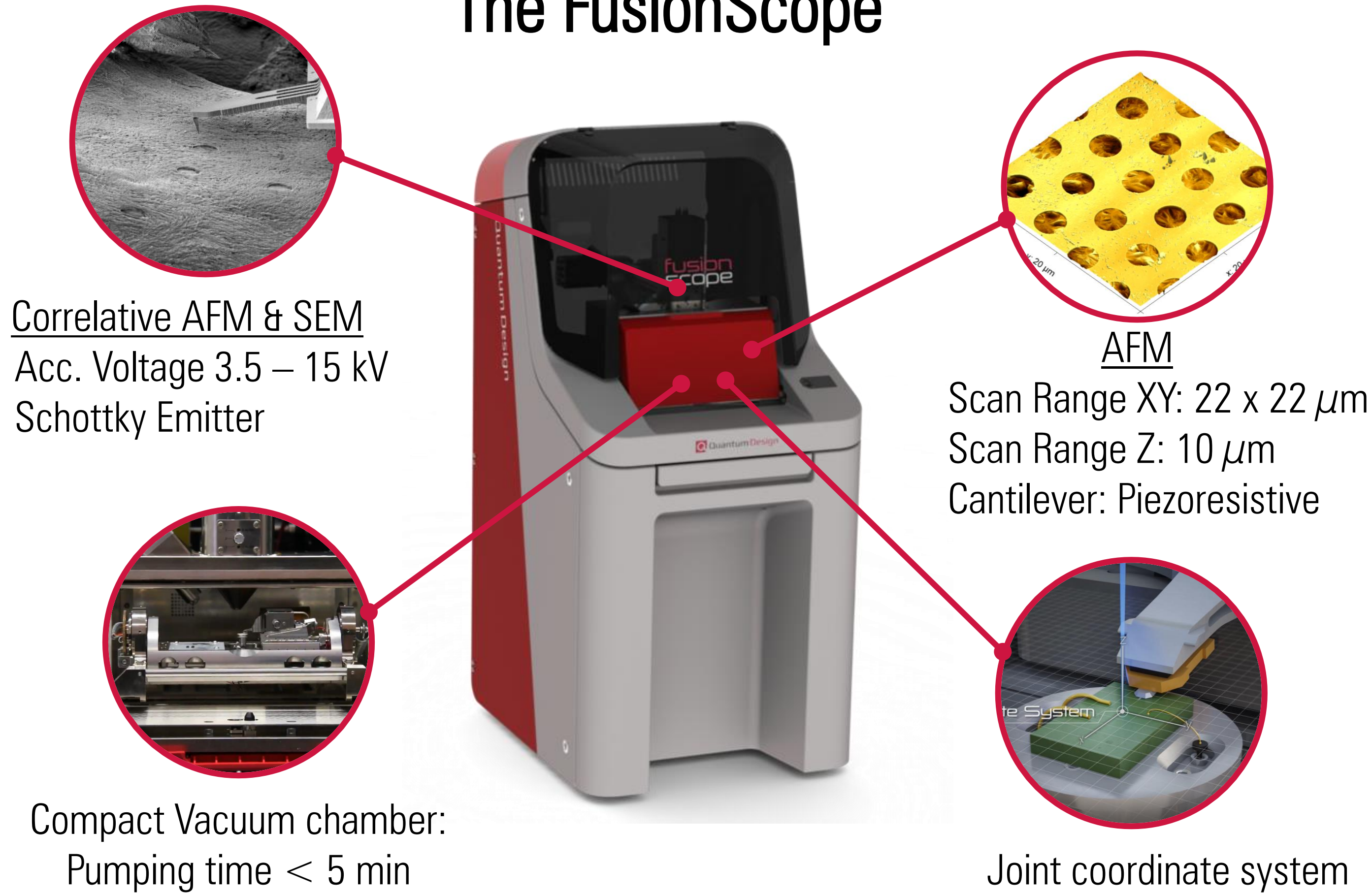
C.H. Schwalb<sup>1</sup>, H. Frerichs<sup>1</sup>, L. Stühn<sup>1</sup>, S. Seibert<sup>1</sup>, D. Jangid<sup>1</sup>, M. Wolff<sup>1</sup>, K. Arat<sup>2</sup>, H. Alemansour<sup>2</sup>, A. Alipour<sup>2</sup>,  
A. Amann<sup>2</sup>, L. Montes<sup>2</sup>, J. Diederichs<sup>2</sup>, J. Gardiner<sup>2</sup>, W. Neils<sup>2</sup>, S. Spagna<sup>2</sup>

<sup>1</sup>Quantum Design Microscopy GmbH, Pfungstadt, Germany

<sup>2</sup>Quantum Design Int., San Diego, USA



### The FusionScope



Correlative AFM & SEM  
Acc. Voltage 3.5 – 15 kV  
Schottky Emitter

Compact Vacuum chamber:  
Pumping time < 5 min

AFM  
Scan Range XY: 22 x 22  $\mu\text{m}$   
Scan Range Z: 10  $\mu\text{m}$   
Cantilever: Piezoresistive

Joint coordinate system



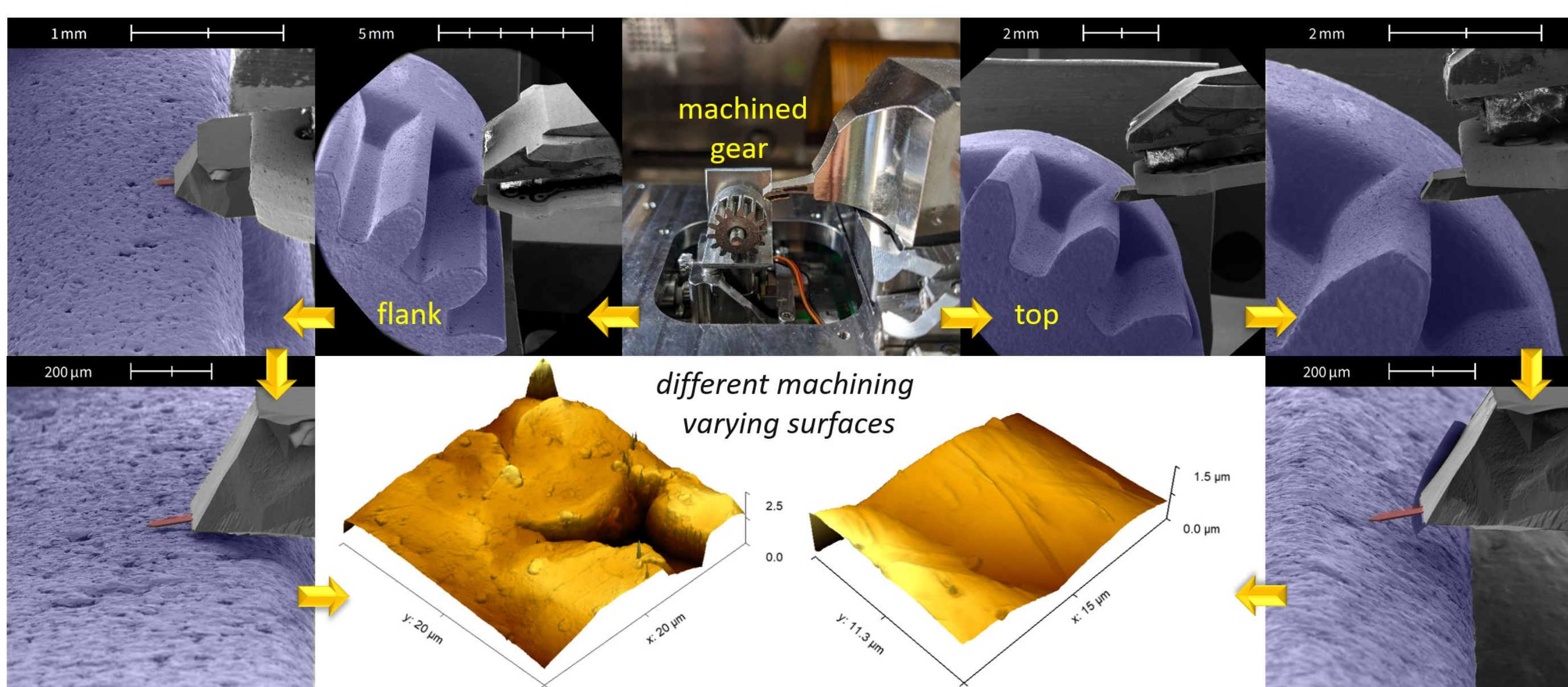
#### Main benefits of correlative AFM & SEM microscopy:

- FusionScope is an easy-to-use correlative microscopy platform designed from the ground up to add the benefits of AFM, SEM, EDS, Nanoprobing and more
- Position the AFM precisely at your region of interest, even on complex and challenging sample surfaces
- Perform a complete suite of characterization techniques by analyzing topographical, nanomechanical, chemical, electrical, and magnetic properties with the power of correlative AFM & SEM microscopy



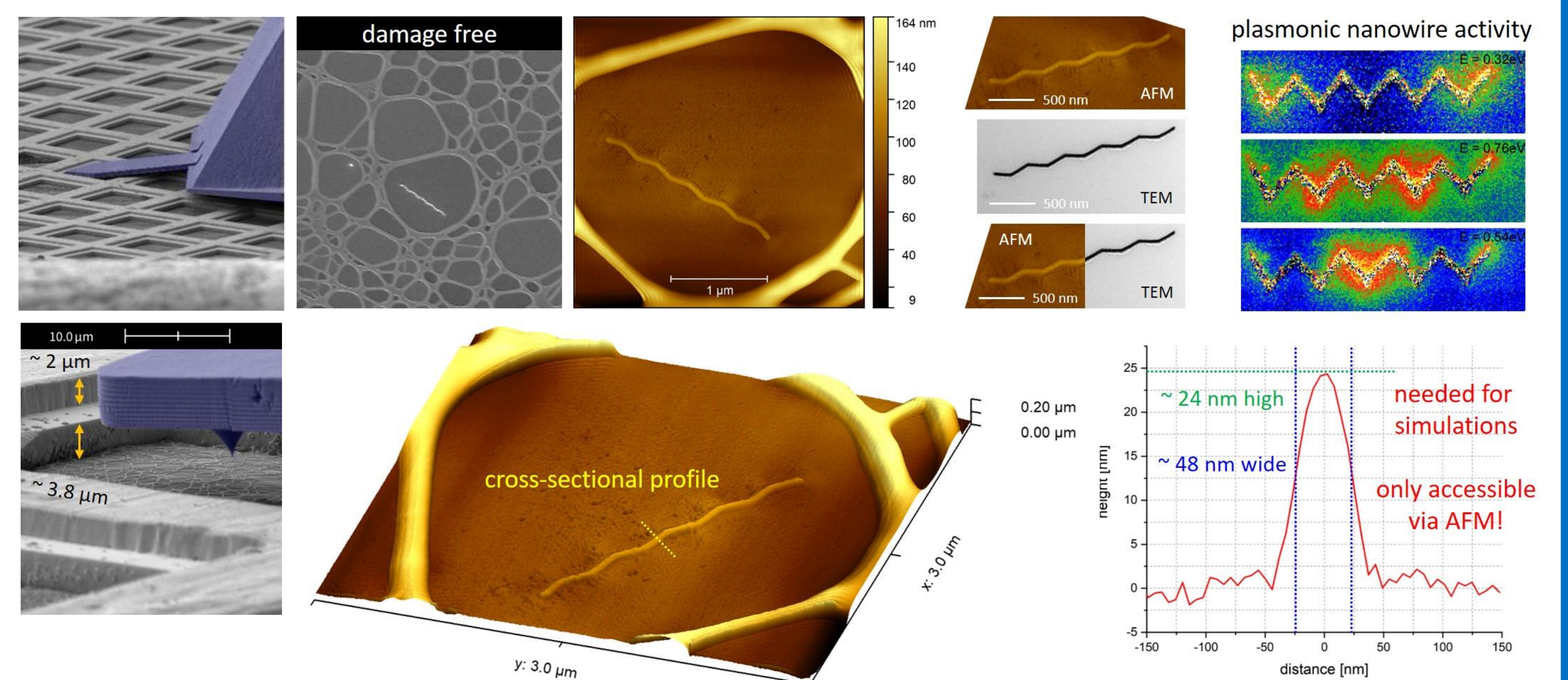
### Hard to Reach Samples

#### Analyze Mechanical Wear of Machined Parts



- FusionScope enables to easily access hard to reach sample areas
- Measure mechanical wear of machined parts

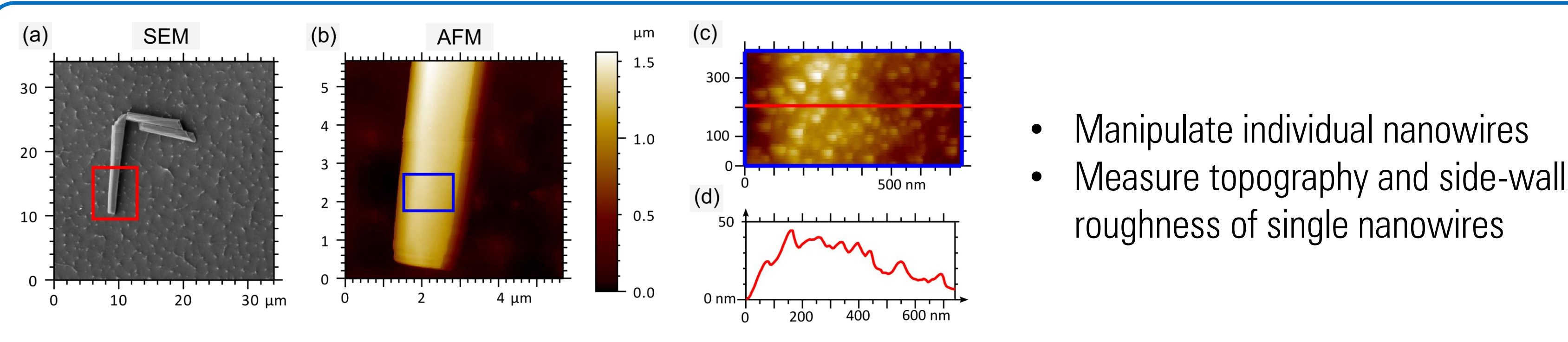
#### Analyze of Au Nanowire on 5 nm C-membrane



- Access 50 nm Au Nanowire on 5 nm thin TEM membrane
- Measure cross-sectional profile and correlate with TEM

Reisecker et al., *Adv. Funct. Mater.* 2310110 (2023)

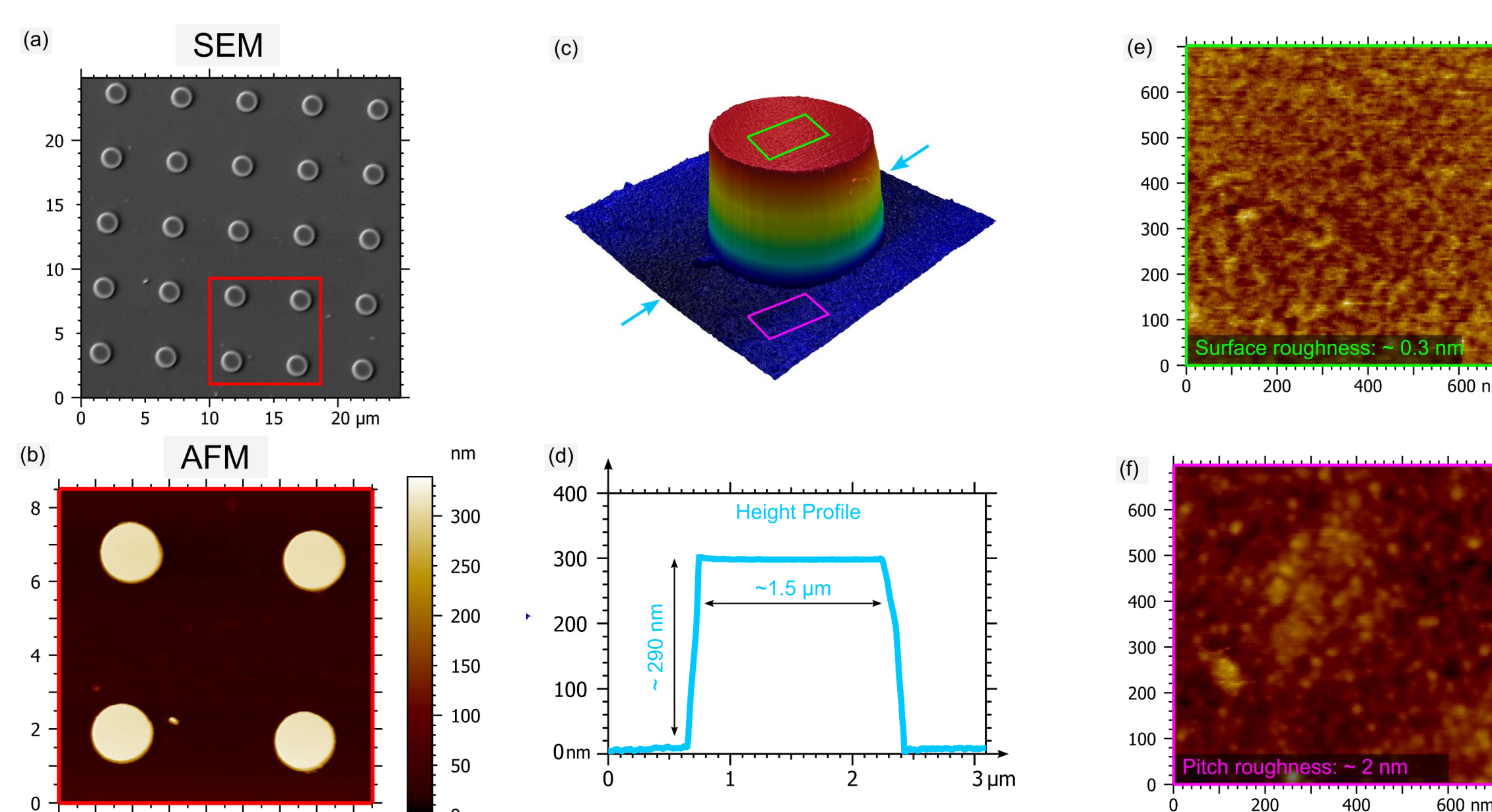
### Analysis of Nanowires



- Manipulate individual nanowires
- Measure topography and side-wall roughness of single nanowires

- Direct correlation of SEM and AFM data
- Measure lateral dimensions and height profile with nanometer resolution
- Analyze surface and pitch roughness

Xu et al., *Appl. Phys. Rev.* 11, 021411 (2024)



### Summary



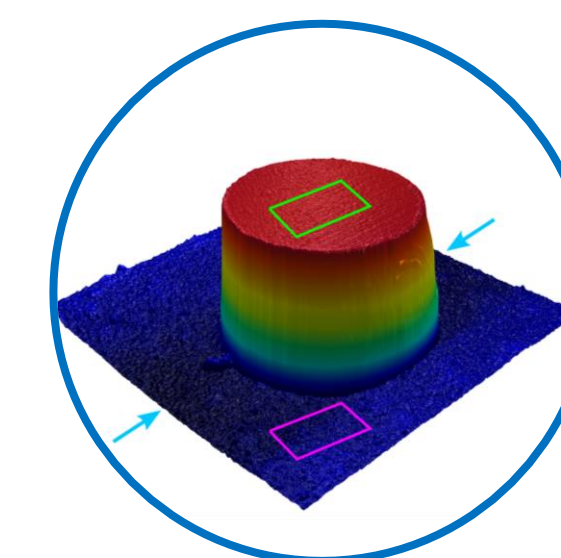
#### FusionScope

Unique combined AFM & SEM tool for interactive correlative analysis on the nanoscale



#### Analyze Mechanical Wear

Measure mechanical wear at hard to reach sample areas



#### Analyze of Nanowires

Perform correlative SEM and AFM analysis of individual nanowires

[www.fusionscope.com](http://www.fusionscope.com)