

From Lab to Fab, Infinitesima to commercialise powerful new methods for semiconductor device characterisation

The addition of tomographic capability builds on a technology that has already broken new ground in taking AFM from Lab to Fab with the launch of the Metron3D.

The RPM, a unique type of Atomic Force Microscope (AFM) has demonstrated disruptive potential, being used in the Metron^{3D} metrology system to deliver in-line imaging at up to 100x the speed of conventional AFM. Using existing features of the design in new ways has enabled further innovation, providing 3D tomographic capability for semiconductor characterisation. The system uses multiple probes to generate sub-nanometre resolution 3D map of conductivity and geometry that can provide powerful insights in the development of new device architectures.

Today's semiconductor devices use complex 3D structures to achieve high density and high performance, with feature dimensions of just a few nanometres. When a device fails it can be challenging to determine the root cause, whether it's particle contamination, dopants, or voids in the structure. The ability to generate sub-nanometre resolution 3D maps of both the device geometry and the local electrical properties enables straightforward visualisation and identification of these defect sources.

Existing tomographic techniques, such as FIB sectioning are limited in applicability due to sample damage, resolution, and measurement acquisition time. The unique capability of the RPM microscope to switch between probes whilst maintaining precise alignment enables layer removal, conductive AFM, and imaging to be fully automated.

To realise this capability, Infinitesima are extending their Joint Development Programme (JDP) with imec. Peter Jenkins, CEO of Infinitesima comments "We are very proud to be continuing our work with imec to commercialise their pioneering research". "To continue Moore's law there is a transition towards ever smaller and more complex 3D device structures. Current characterisation and metrology methods are reaching their limits and we need new solutions now to enable the technology of tomorrow."

Infinitesima Ltd are leading the transition of AFM to in-line metrology. Learn more about the [Metron3D](#) and the [RPM technology](#).



Tomogram of a 3D NAND structure (left). Patrick Hole, Matt Tedaldi and Deepanjan Sharma of Infinitesima meet with Umberto Celano of imec for the renewal of the JDP (right).