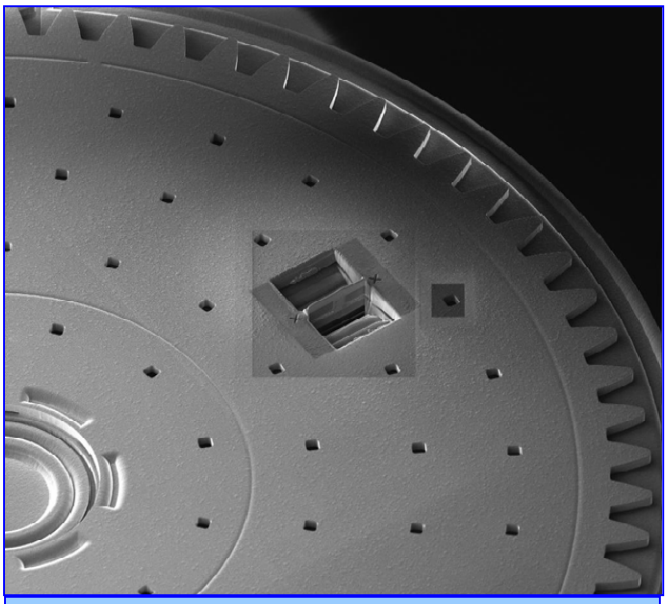

European Focused Ion Beam Services for MEMS Partners

# *Expert FIB Nano-Surgery Services for MEMS Applications – 'off the shelf'*

Supporting your design and manufacturing process with expert 'Structural Edit' for rapid prototyping, '3D Structural Metrology' and Failure Analysis – when you need it.

## '3D Structural Analysis' of MEMS structures using FIB solves construction issues.

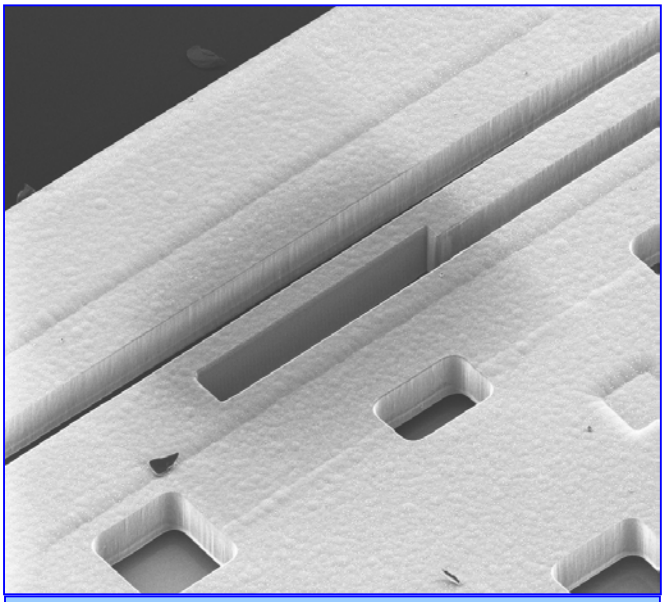
Understanding the cause of process or functional failures requires the application of various microscopy techniques to site specific locations – often within a failed device.
Whether your needs are simple metrology or a more detailed high resolution analysis – both can be delivered from the required location using the nano-sectioning capabilities of FIB. Applying SIM, SEM and TEM – all enabled with FIB, we can help you understand your device structure and any failure modes. NanoScope's fast turn-around 'off the shelf' expert service, makes this available at every level of MEMS development.



FIB x TEM section preparation from MEMS 'cog' (foil width ~20um)

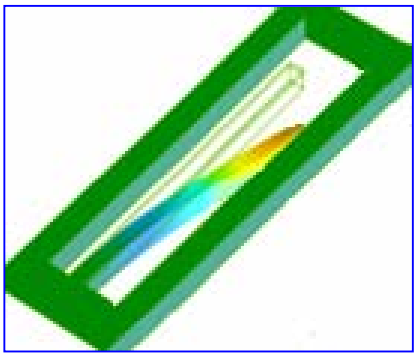
## 'Structural Edit' of MEMS components using FIB permits rapid protoype development.

This is the ability to quickly tweak the physical structure of a MEMS component to rapidly test or qualify its physical behaviour.
IC designers have used FIB technology for 20 years, to shorten the development cycles of new chip designs, ramp up production yield, and to reduce the costs and time to market of new products. Many IC companies have branched out into MEMS development and are already using in-house FIB instruments to enhance their competitive edge for developing new MEMS products.

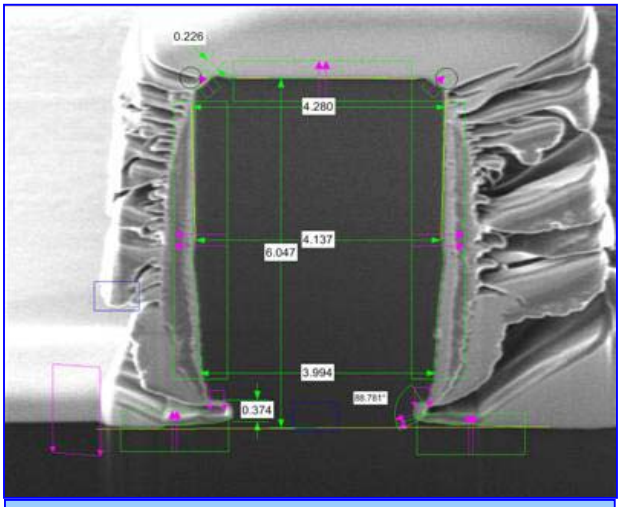


Accelerometer spring modification (50% reduction in spring strength)

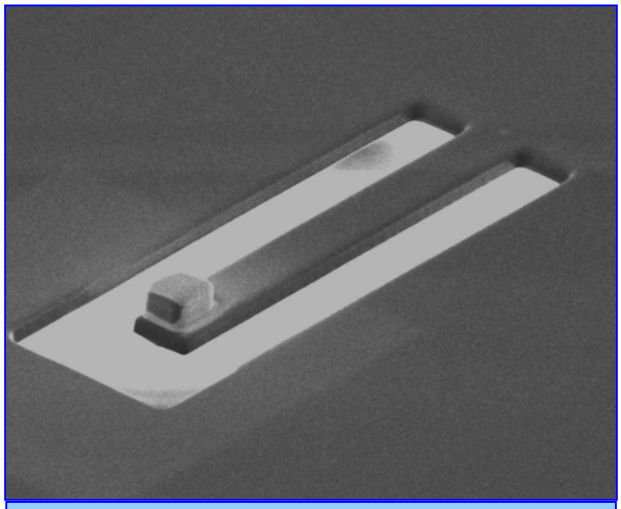
## ‘Structural Prototyping’ - direct nano-fabrication of structural prototypes.



The ‘dial up’ nano-Surgery capabilities of FIB offer a quick and low cost method of verifying simulation models or proof of concept designs. NanoScope offer these capabilities ‘by the hour’ making them immediately available to support your engineering team, whatever it’s size – giving you immediate and expert access to the most advanced toolsets.
These examples show a waveguide which has undergone site specific 3D metrology, and also a simple SiN membrane which has been machined (proof mass added) into a cantilever (oscillator) to verify mathematical model precision.



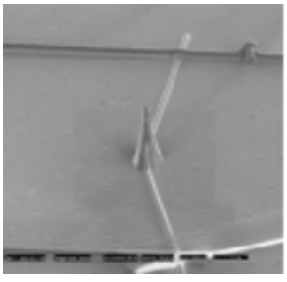
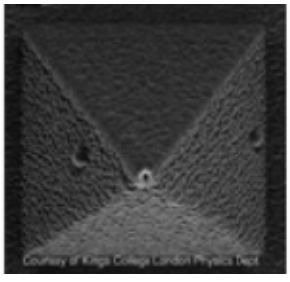
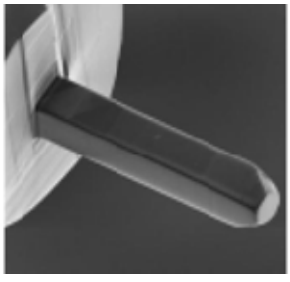
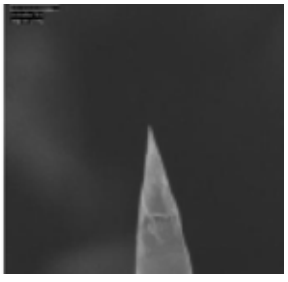

Waveguide metrology – within a FIB milled section (result time 20 mins)



Membrane sculpting for Cantilever modelling (length15 µms)

## Enabling toolsets for advanced MEMS development

Probes and tips for AFM, SPM, micro-indenters, electrical probing, SNOM and nano-manipulation may be customised using FIB in just a few minutes. Form and function, and even the chemical coating of many probe variants may be customised to compliment your process.

***Serving the European market since 1994, the engineers at NanoScope offer extensive experience both with existing MEMS applications, and rapid new process development.***
***Call us for ‘off the shelf’ Nano-Surgery, when you need it.***

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