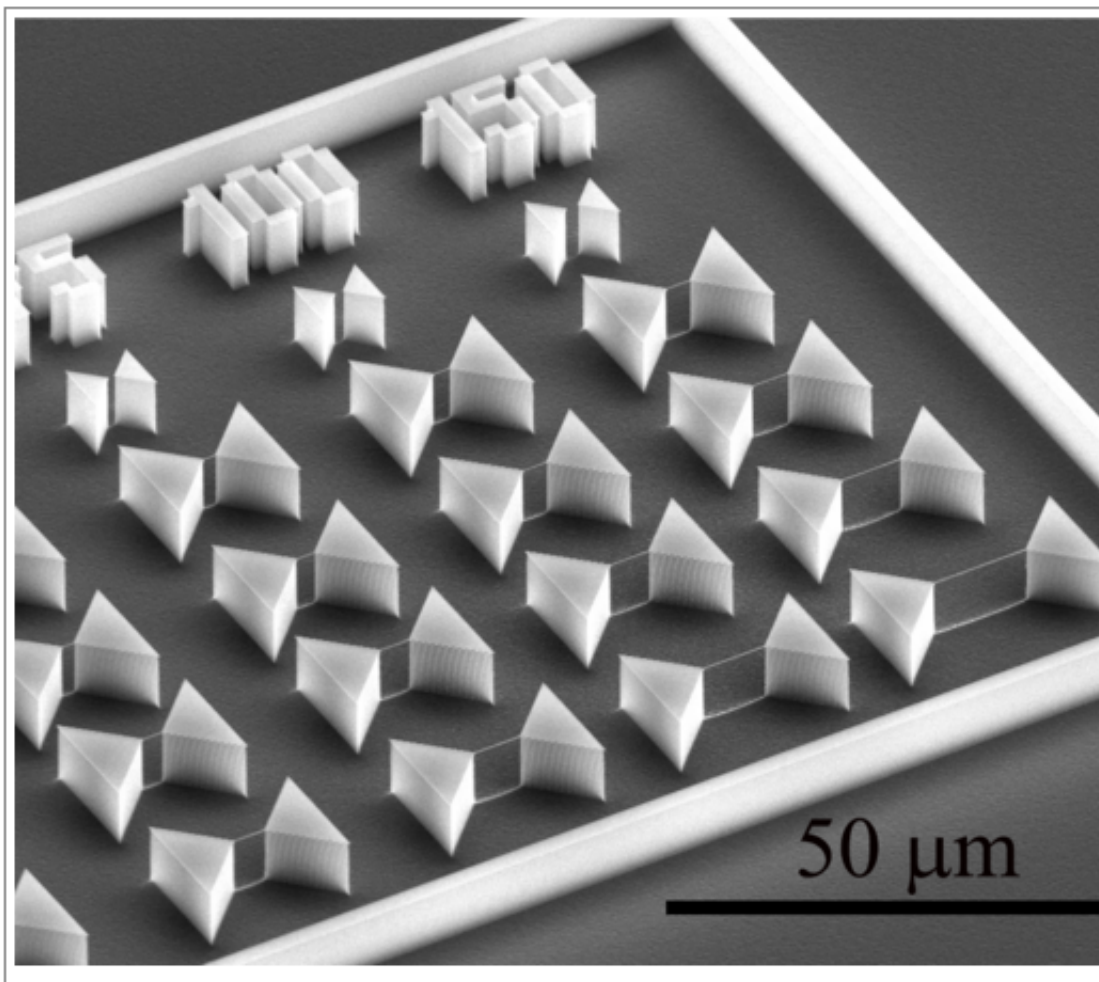


Fabrication of silicon nanowires bridging thick silicon structures

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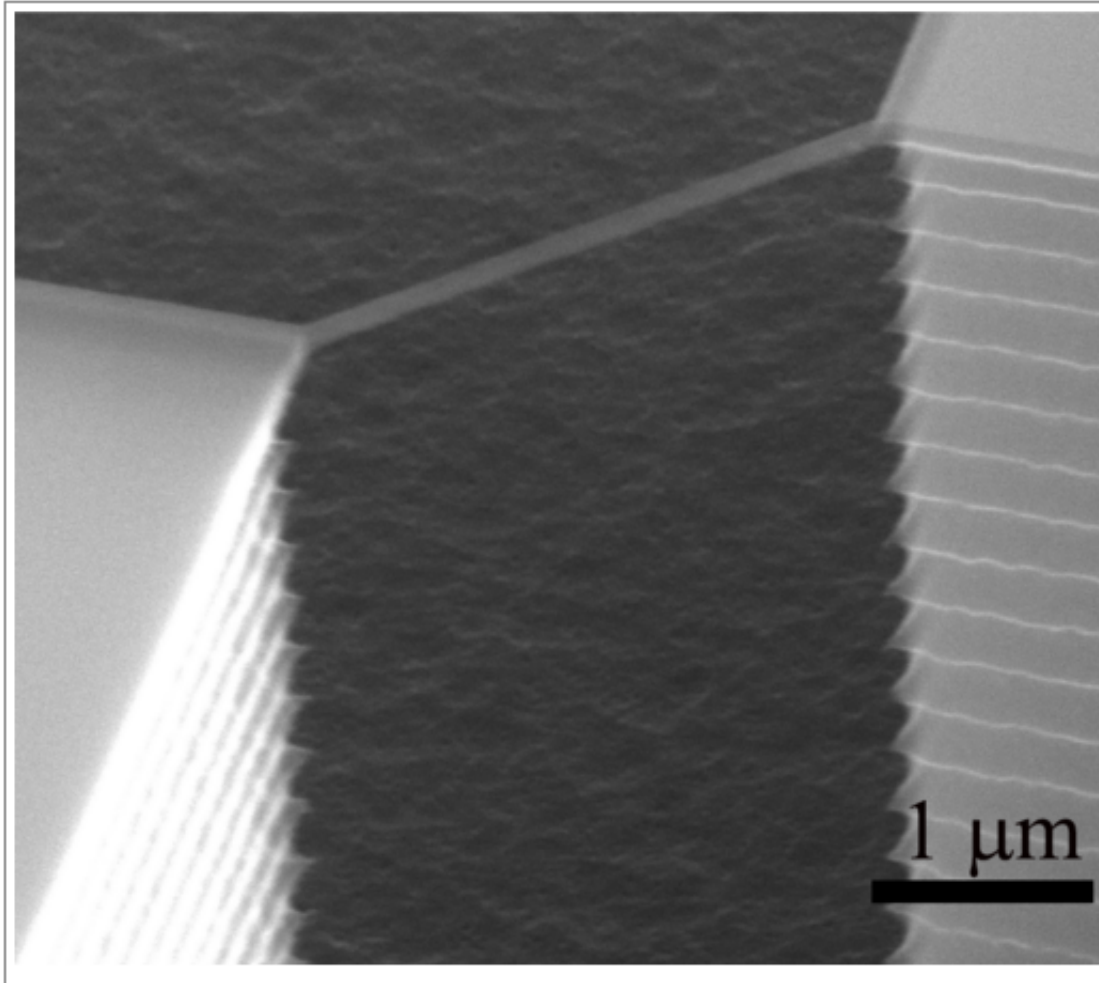
A team led by researchers from Koç University, Turkey and EPFL,

Switzerland, has developed a monolithic technique to fabricate silicon nanowires spanning ultra-deep trenches in silicon.

The approach resembles an extreme, nanoscale version of the SCREAM process developed in the early 90s for MEMS fabrication. This new fabrication technology relies on "carving" [silicon nanowires](#) within a chunk of [silicon crystal](#) such that the nanowires are fully integrated with other [silicon](#) structures that are thousands of times bigger. The minimum nanowire dimension is on the order of 20 nm and nanowires resemble suspended cables hanging a distance of 10 microns from the trench bottom with room for further improvement of the etch depth.

The technology relies on an intricate balance between two different plasma etching processes. As the first process creates the nanoscale component, the subsequent process is responsible for etching deep trenches. Protection of the miniature bridge, the nanowire, during this harsh deep etch is crucial for the success of the technique.

The appealing aspect of this top-down technology is that the nanowires and the microscale structures are formed simultaneously allowing on-the-spot fabrication without any need of carrying, manipulating and "gluing" the nanowires to the desired location. This way each silicon nanowire is perfectly aligned with respect to the surrounding architecture. Hence, one can form millions of such bridges in parallel. The [technology](#) opens up the possibility of bridging very thick structures with very thin channels. It is expected to find applications especially in SOI MEMS sensors.



More information: Zuhail Tasdemir et al. Monolithic Fabrication of Silicon Nanowires Bridging Thick Silicon Structures, *IEEE Nanotechnology Express* (2015). [DOI: 10.1109/XNANO.2015.2469312](https://doi.org/10.1109/XNANO.2015.2469312)

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