

# **Semiconductor Nanotechnology: There is Plenty of Room All-Around**

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**Abstract:** From lasers to transistors, semiconductor nanotechnology has played an indispensable role in modern civilization. The aggressive miniaturization and integration requirements in electronics, photonics, and quantum technologies continue to demand new discoveries and innovations in materials and device architectures. In this talk, I will present two of the nanofabrication platforms my research group pioneered that could potentially help address some of the profoundly increasing complexity in dimensional scaling and share perspectives on the future of semiconductor nanotechnology: (1) an unorthodox anisotropic etching method, metal-assisted chemical etching (MacEtch), that enables site-controlled damage-free semiconductor nanostructure fabrication with unprecedentedly-high aspect ratio and versatility in materials and structure; and (2) a 3D self-rolled-up membrane (S-RuM) nanotechnology platform for extreme miniaturization of passive electronic components, including inductors, transformers, and filters, for radio frequency integrated circuits (RFICs) and power electronics.