



**Nanowire devices for beyond CMOS technologies:
lithography & contacting challenges.**

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**Eurosensors 2016, PiezoMAT
Workshop,**



Tyndall
National Institute
Institiúid Náisiúnta





Tyndall & FP7 success

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90 EU FP7 projects

Worth **€299M**

ICT, NMP, Security,
Energy, Environment,
ENIAC, ARTEMIS,
CATRENE Marie Curie

Coordinator
27 projects

€48M to Tyndall
& Irish Partners

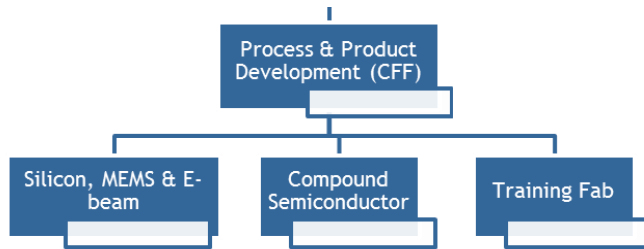
420 FP7
partners

€38M to Tyndall +

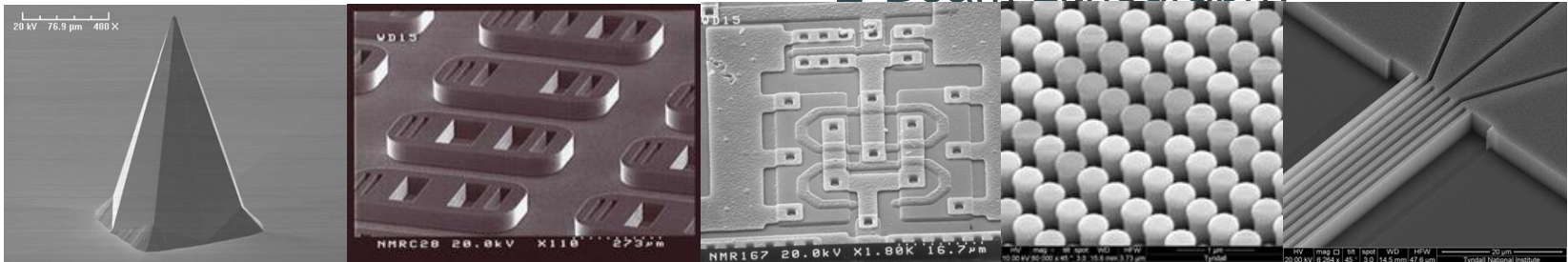
€10M to Irish Partners

40 Countries

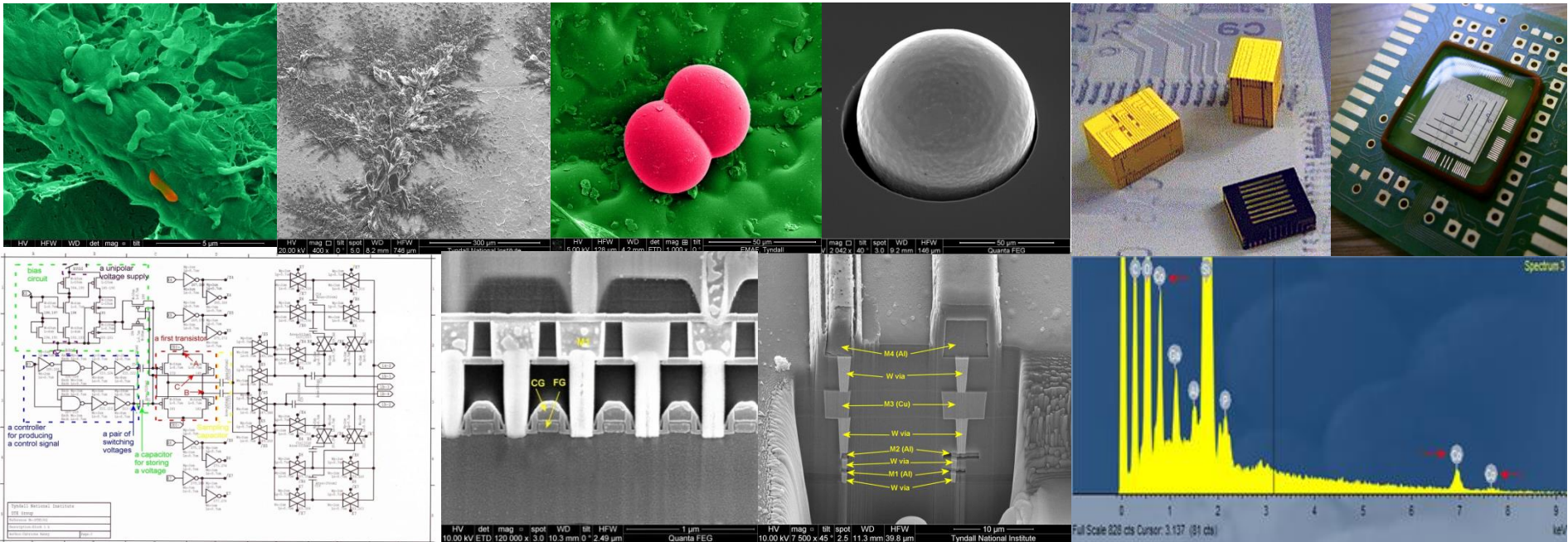
Tyndall: Process & Product Development



- Silicon MOS Fabrication
- MEMS Fabrication
- Compound Semiconductor Fabrication
- Training Facility
- E-Beam Lithography

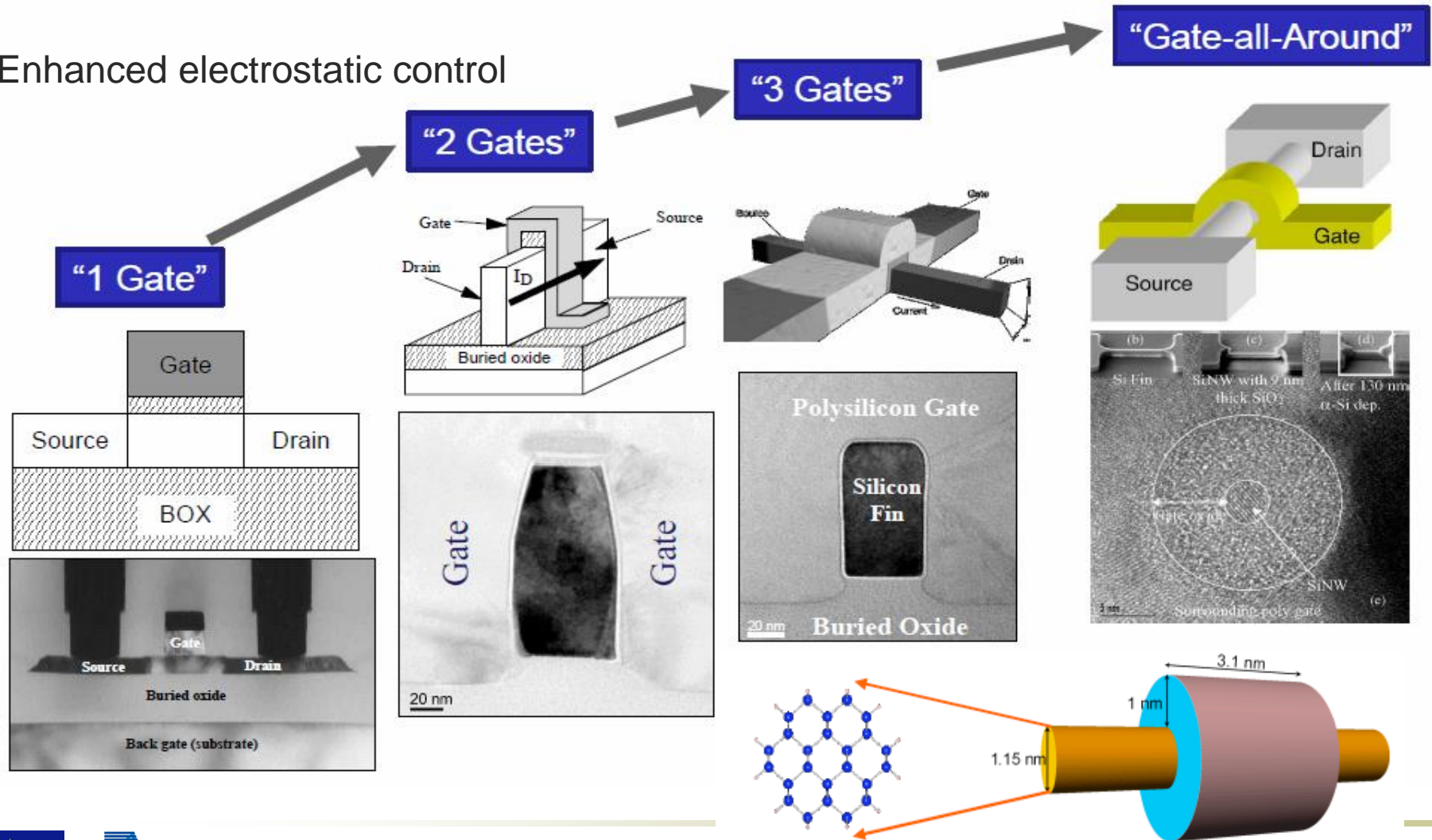


Tyndall: Device Forensics



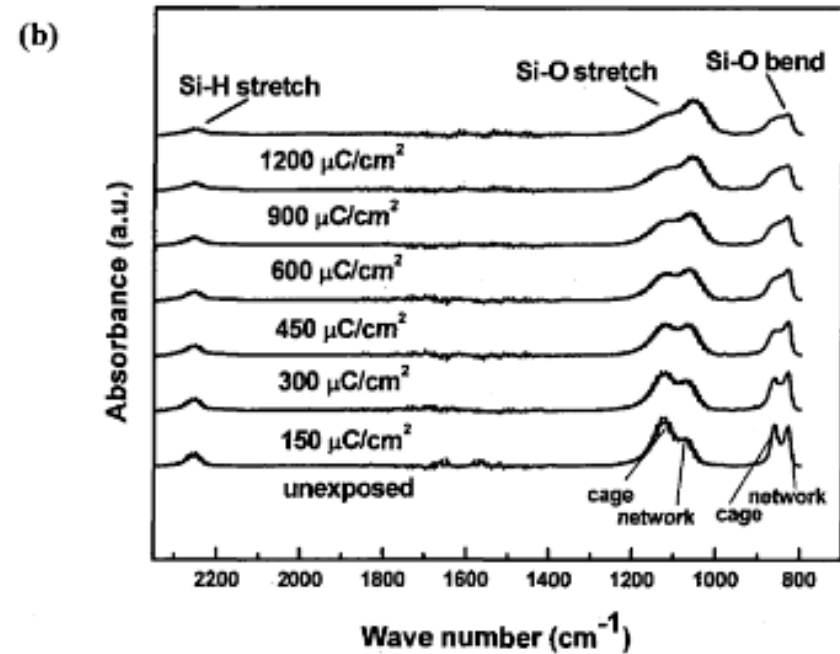
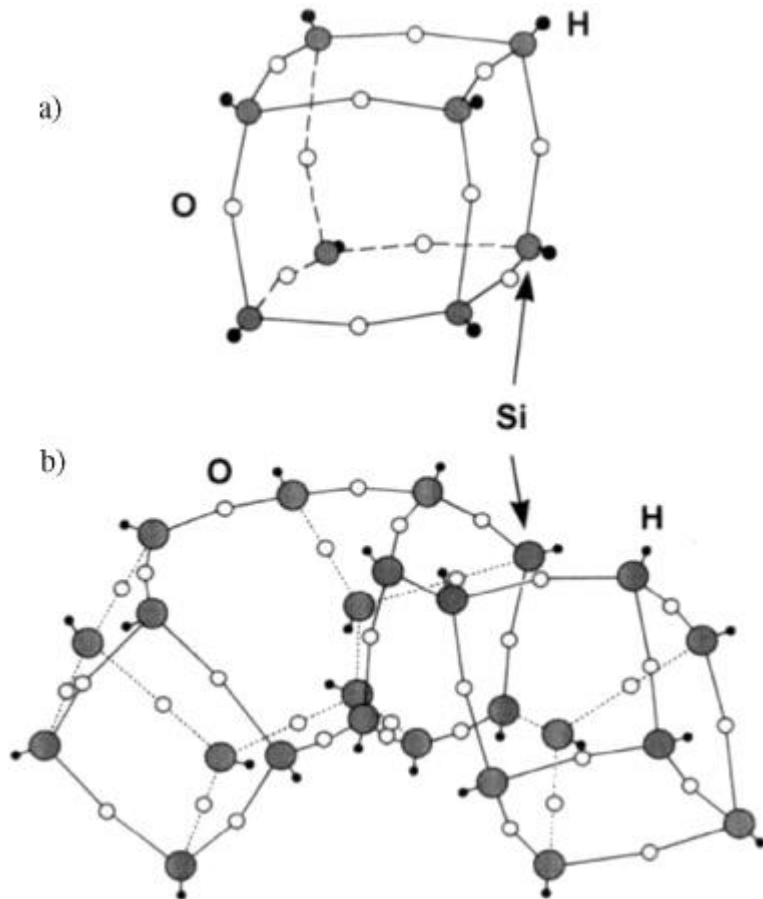
Nanowire transistors

Enhanced electrostatic control

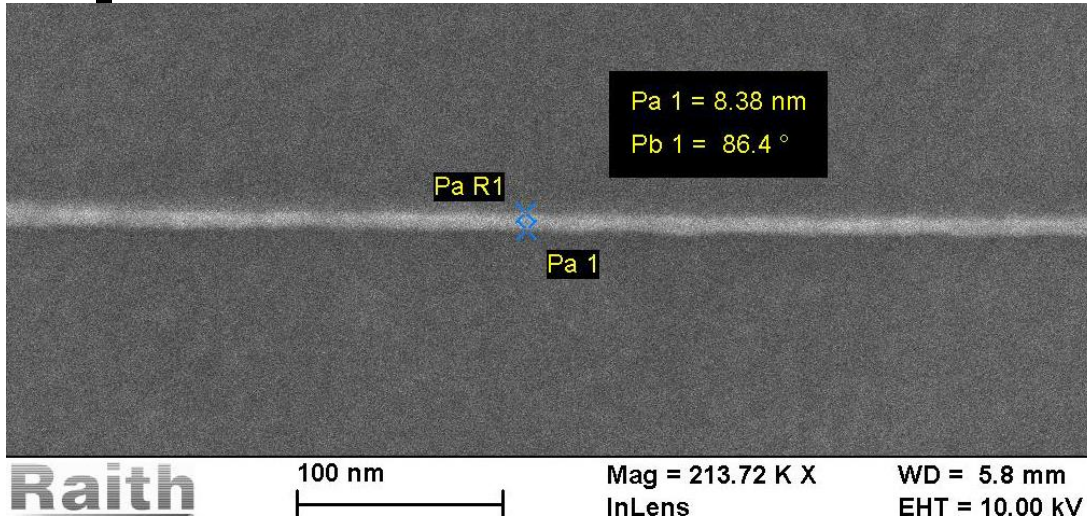


High resolution EBL

Hydrogen silsesquioxane (HSQ)

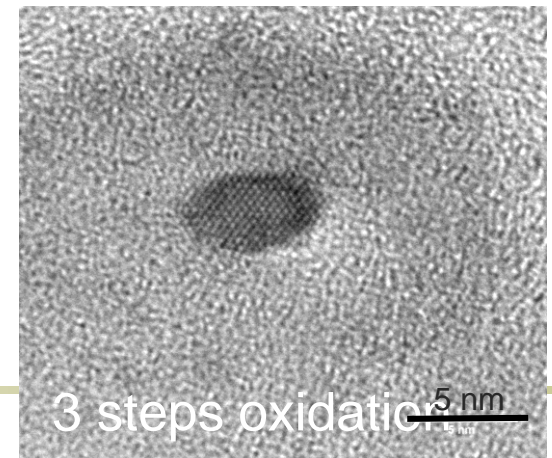
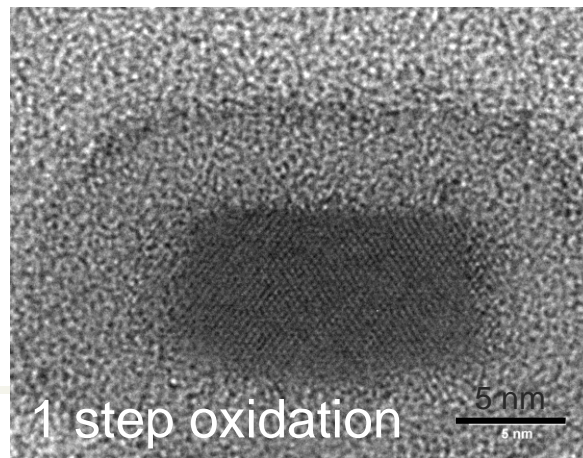
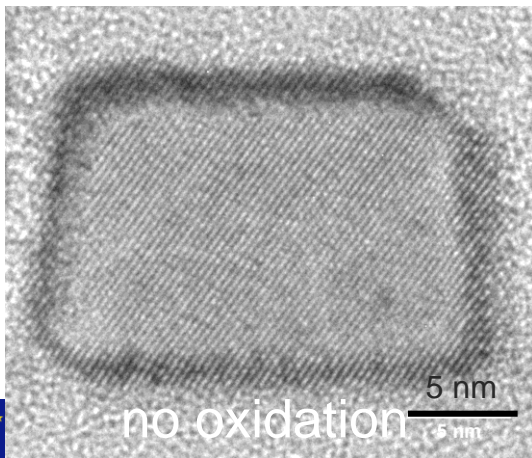


Sub-10 nm Si NWs

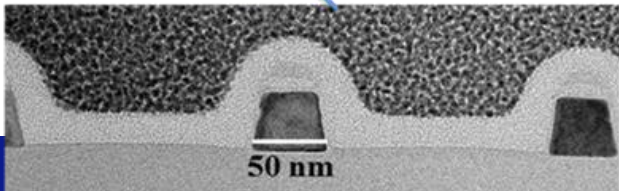
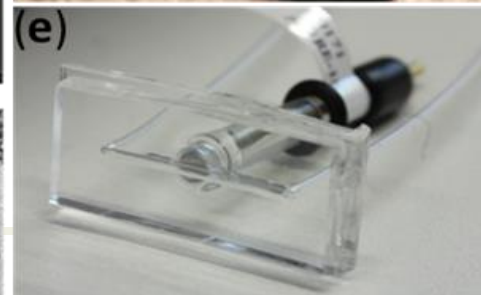
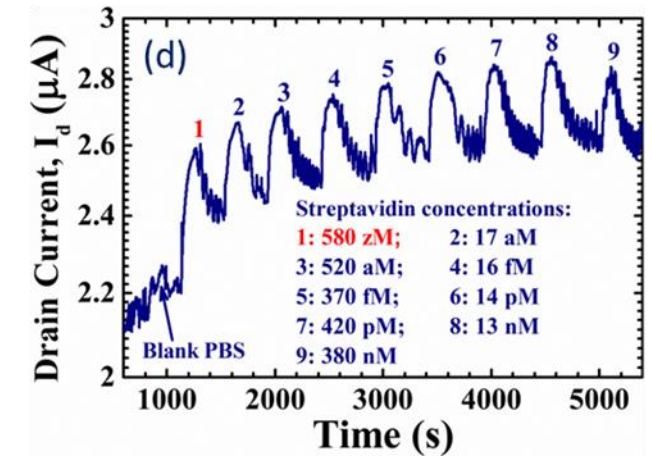
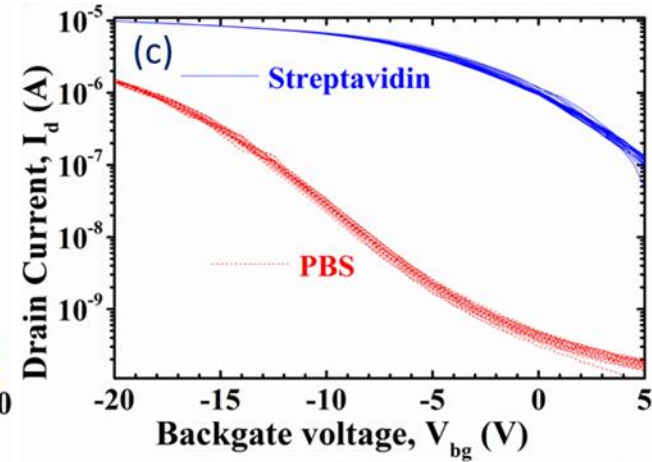
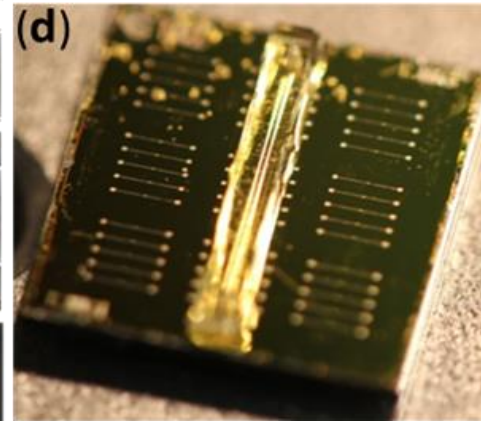
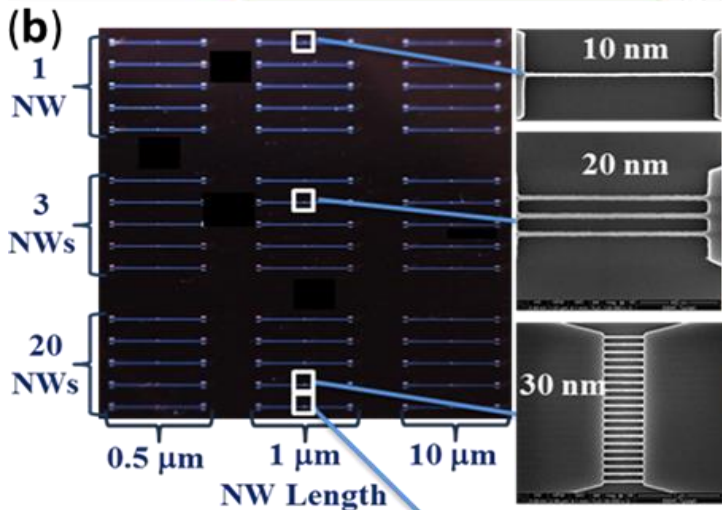
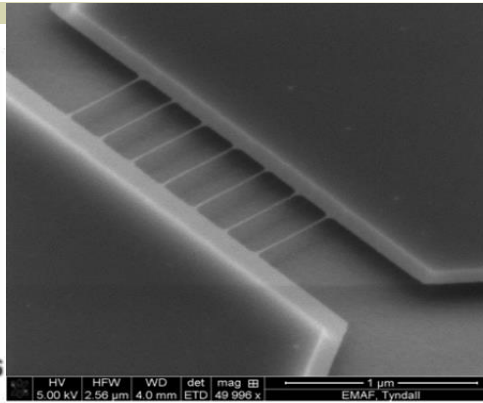
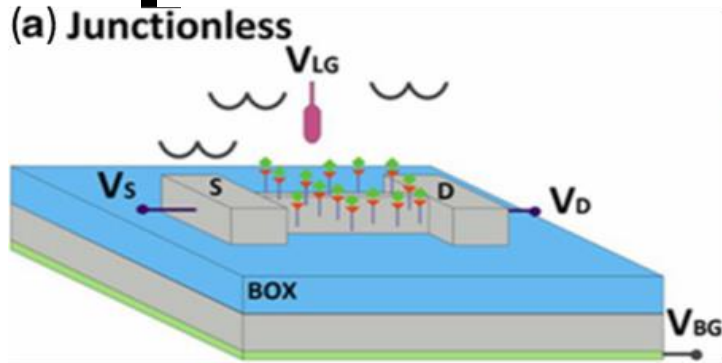


HSQ mask with sub-10 nm line width

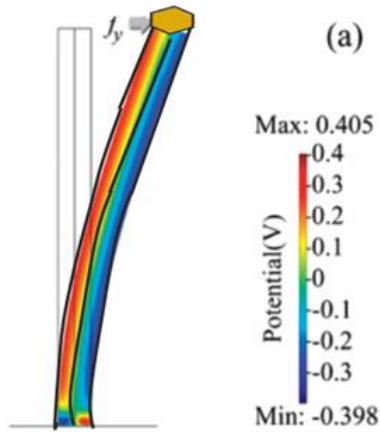
HSQ mask with 20 nm line width and reduction of the Si-body by oxidation



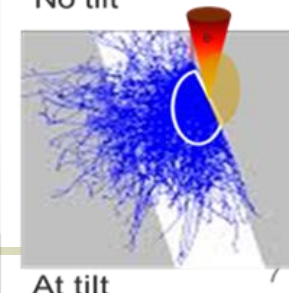
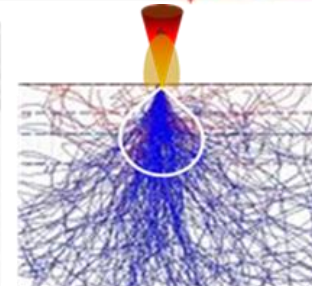
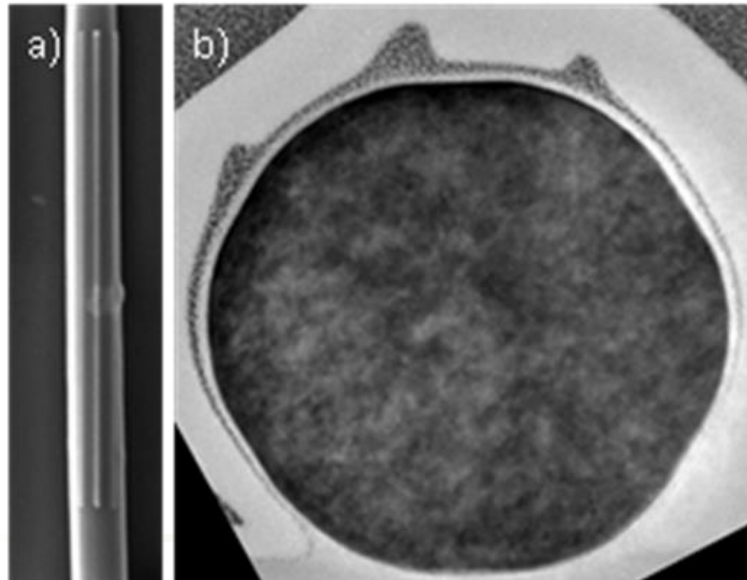
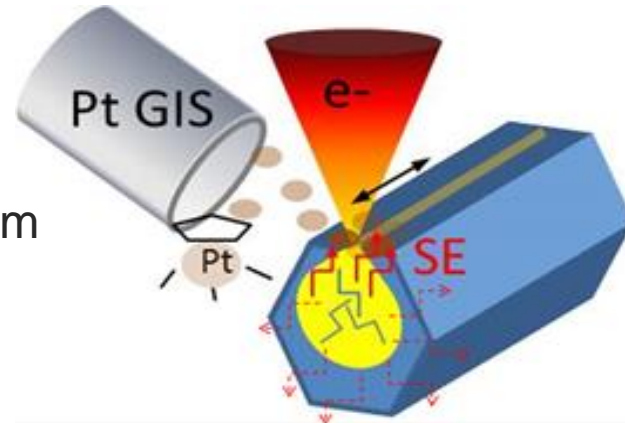
Semiconducting Nanowire Platform for Autonomous Sensors

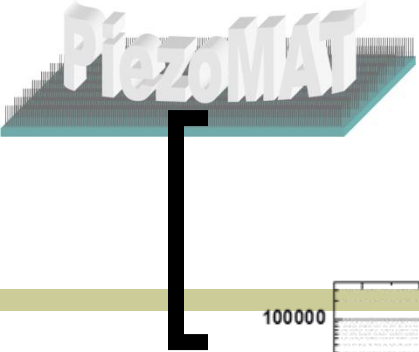


Contacting individual facets of vertical structures



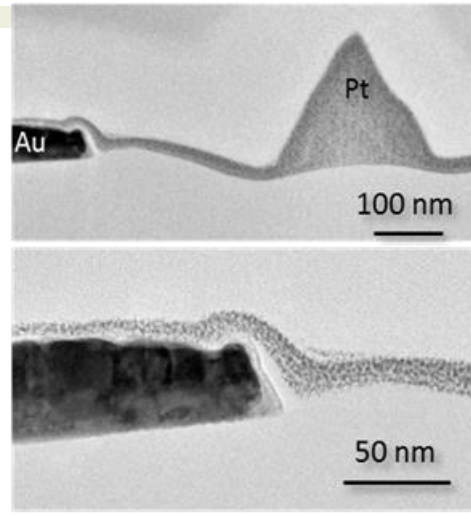
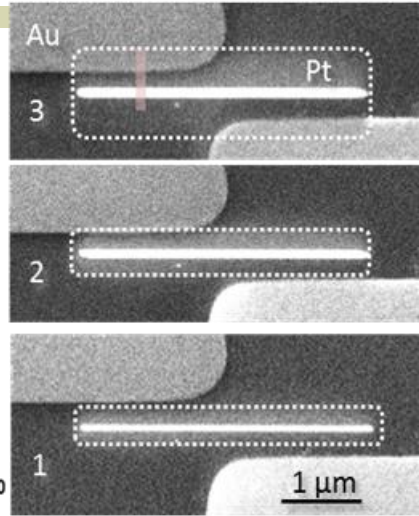
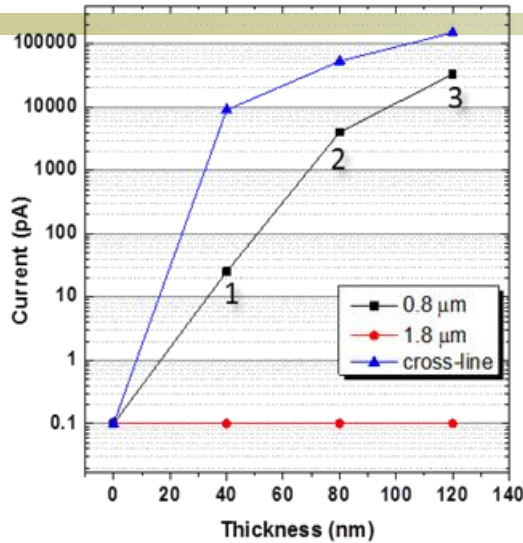
Electron beam induced deposition (EBID)



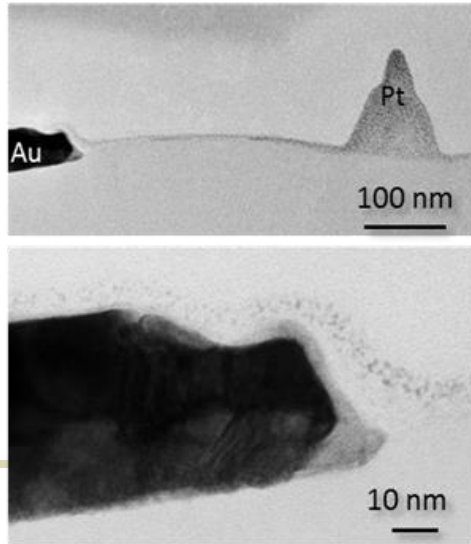
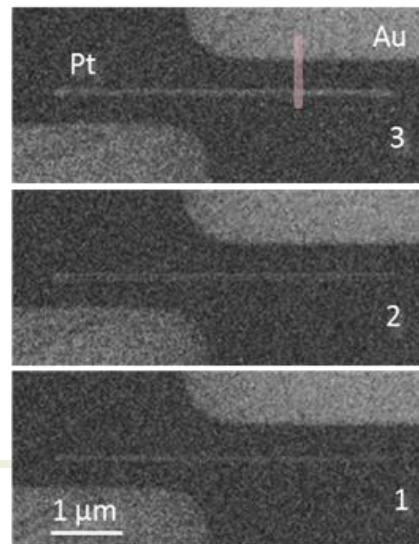
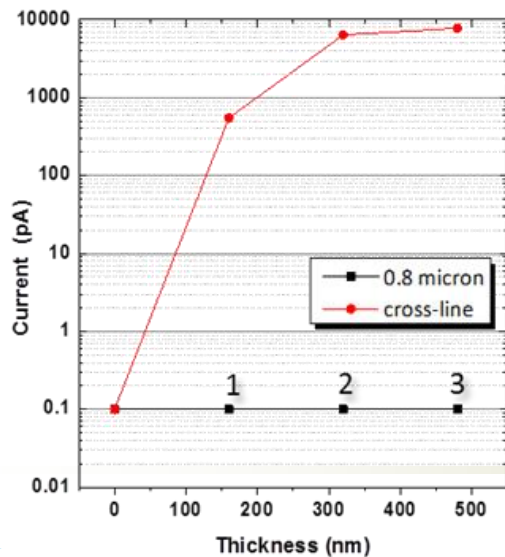


Understanding EBID halo formation

5 kV



30 kV



EBID on individual vertical facets and prototype devices

