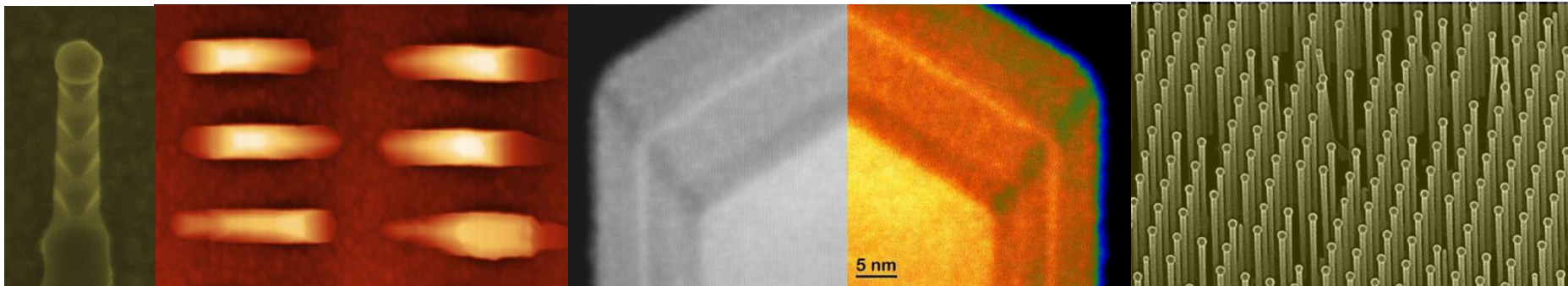


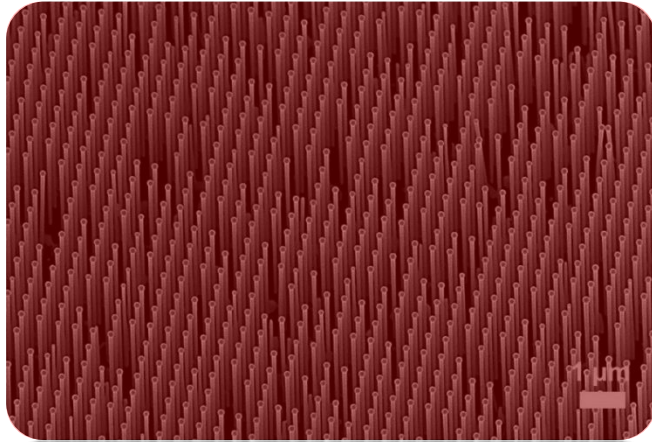
Research Overview of the Laboratory of Semiconductor Materials (LMSC)

Valerio Piazza, Anna Fontcuberta i Morral

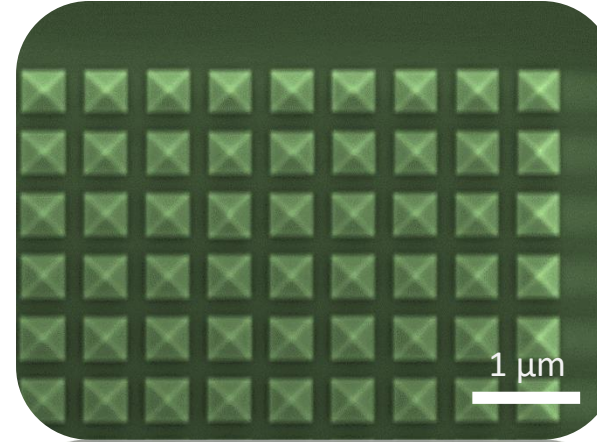


Field of Research:

Nanostructured Semiconductors for electronics, photonics and optoelectronics



Vertical Nanowires
GaAs on Si
Photodetection



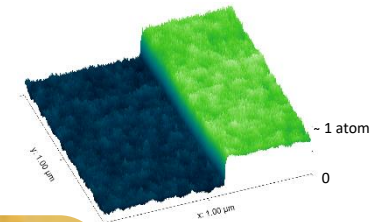
Nanopyramids
Zn₃P₂ on InP
Photovoltaic



Horizontal Nanowires
Si/Ge on Ge
Quantum Transport

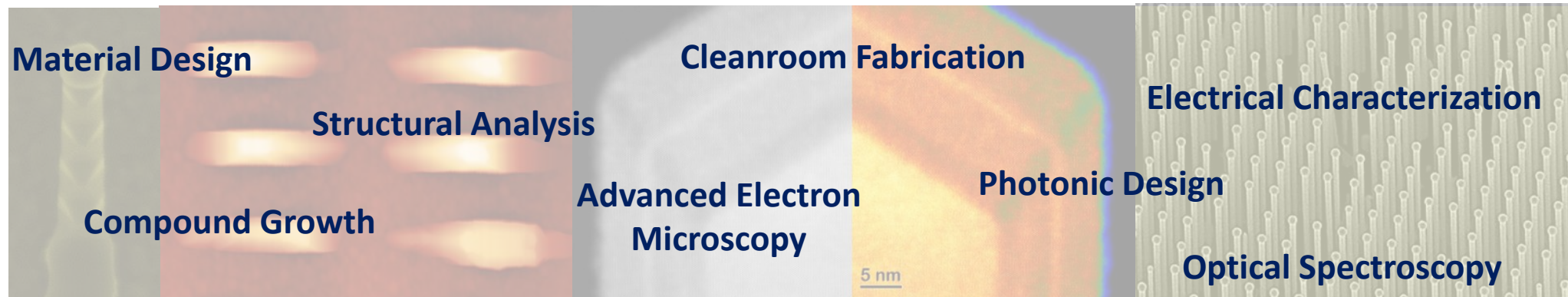
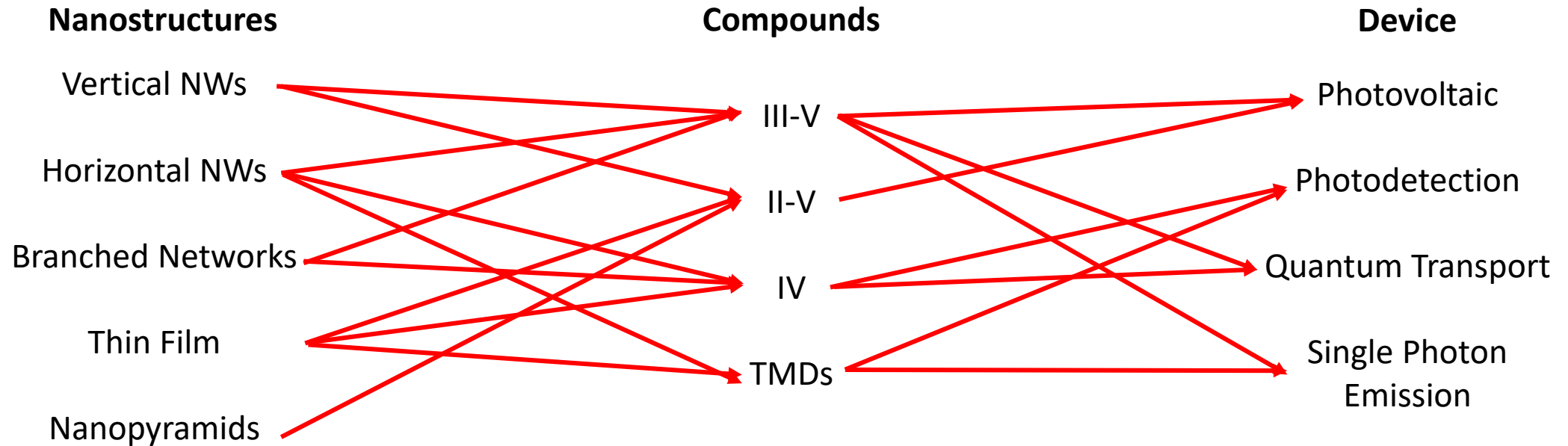


2D Monolayers
MoS₂/WSe₂
Single Photon Emitters

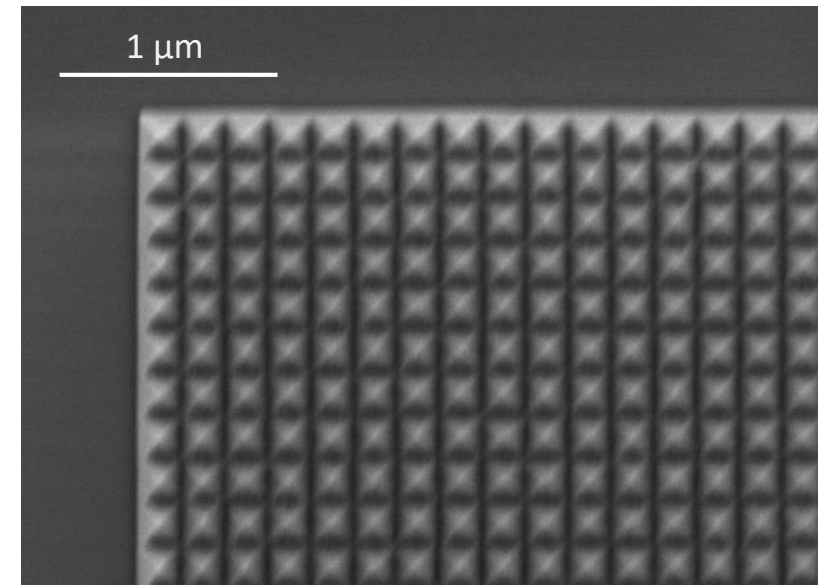
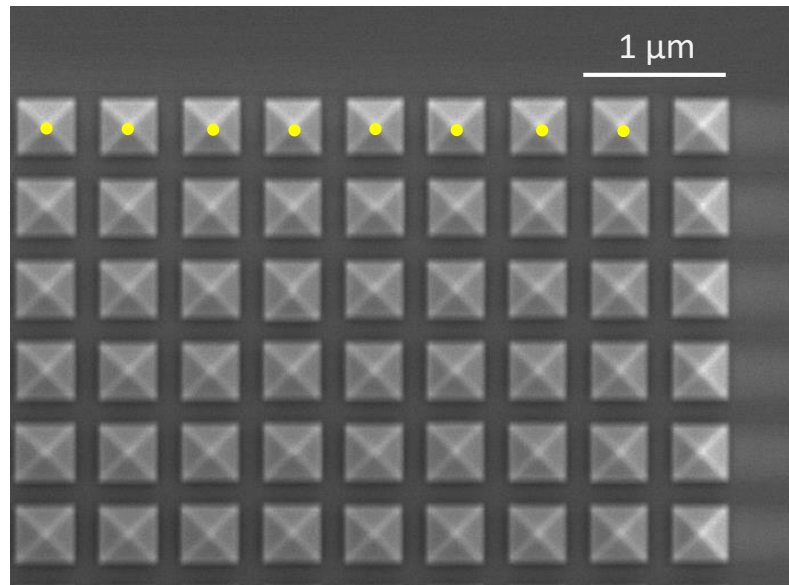
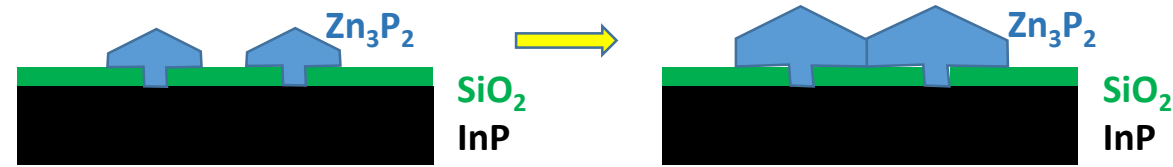


Field of Research:

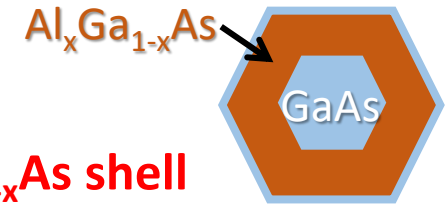
Nanostructured Semiconductors for electronics, photonics and optoelectronics



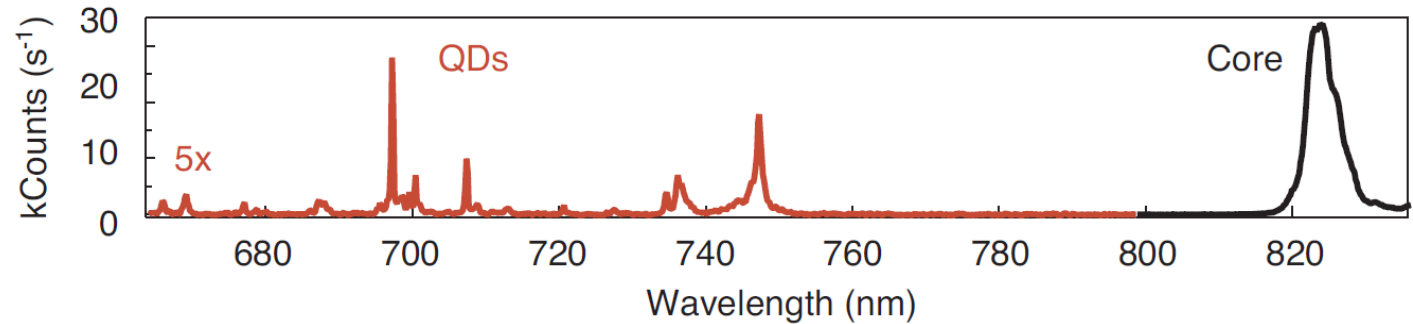
1. Zinc-phosphide as an earth abundant absorber in PV



2. Single photon emitters



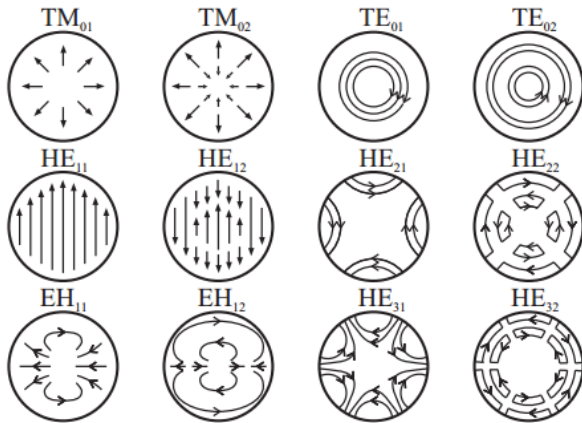
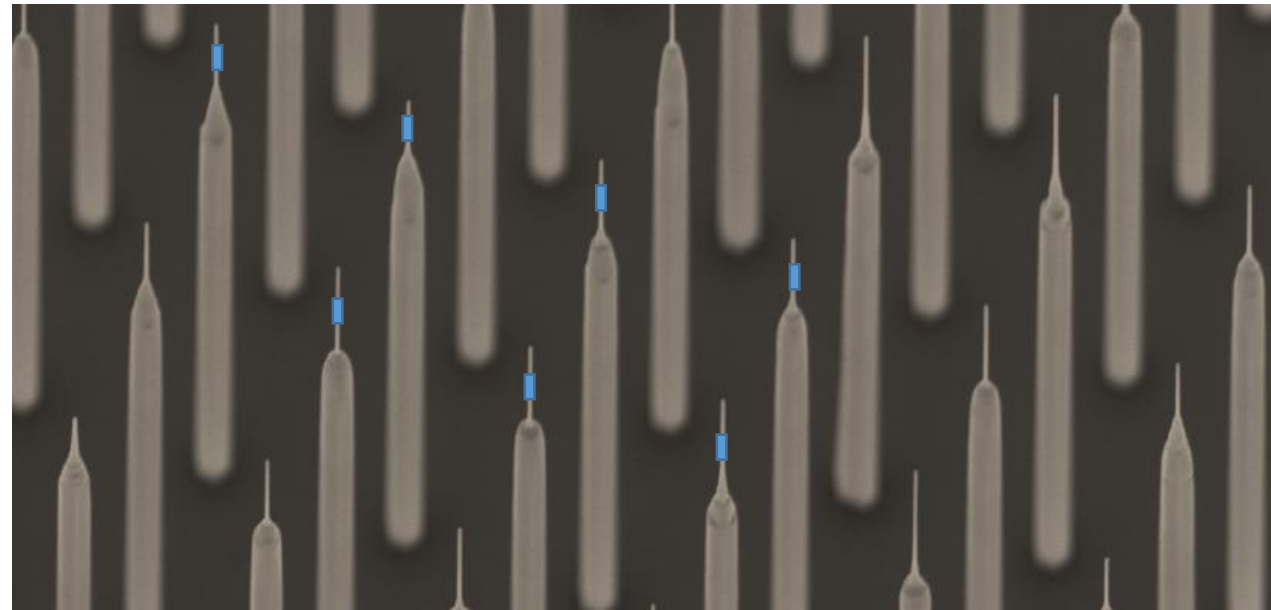
GaAs nanowires with a single $\text{Al}_x\text{Ga}_{1-x}\text{As}$ shell



M. Heiss et al, Nature Mater 12, 439 (2013)

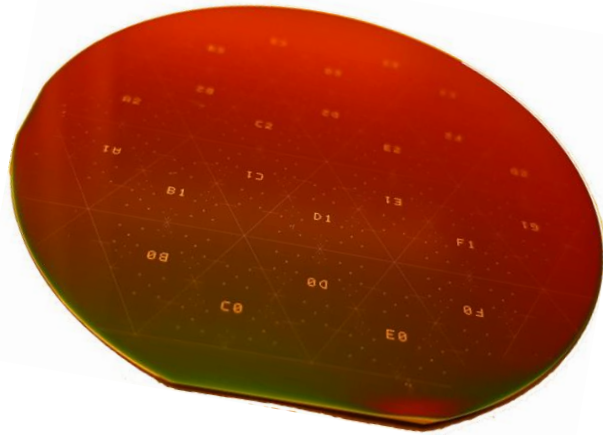
The morphology and size allow for bright photon emission and high absorption

New approach: axial variation of composition

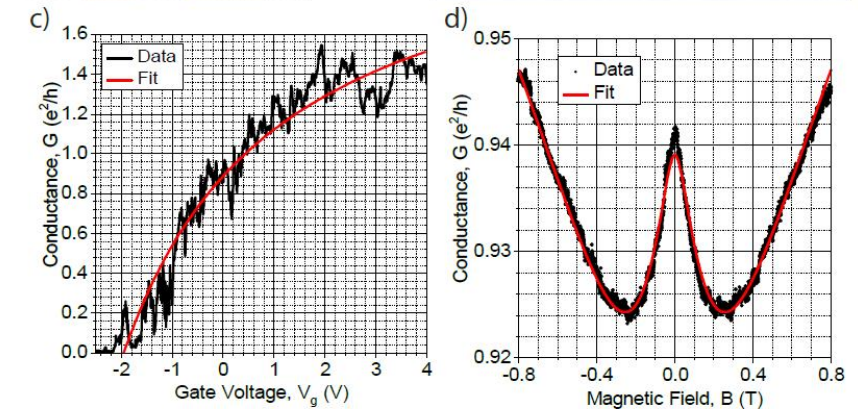
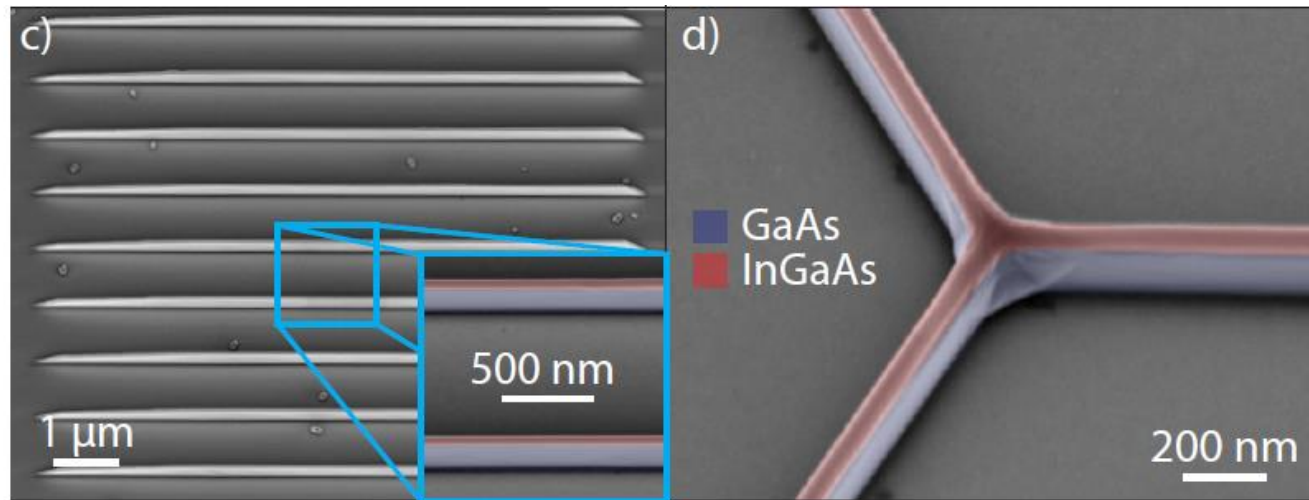
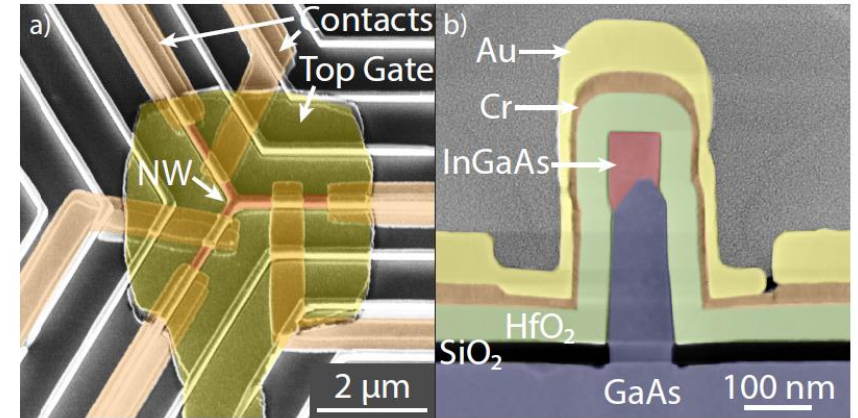


G. Grzela, PhD Thesis (2013), AMOLF

3. Scalable nanowire networks



Wafer scale



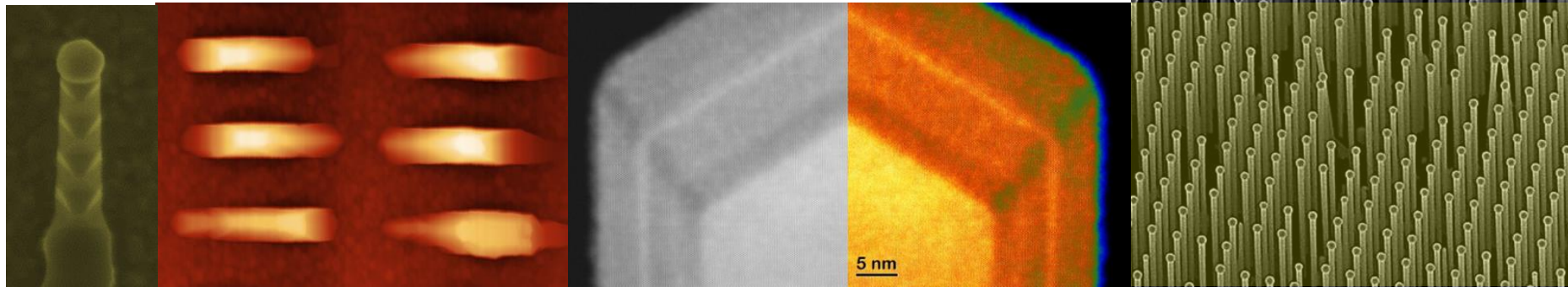
$I_e \sim 250$ nm
Through the Y-junction



M. Friedl, K. Cervený, AFiM et al, Nano Lett (2020)
M. Friedl et al Nano Lett. (2018), M. Friedl., EPFL Thesis (2019)

Thank you for your kind attention

Valerio Piazza, Anna Fontcuberta i Morral



Available TP IV, Semester, Master Projects at LMSC can be found in the webpage epfl.ch/labs/lmsc/