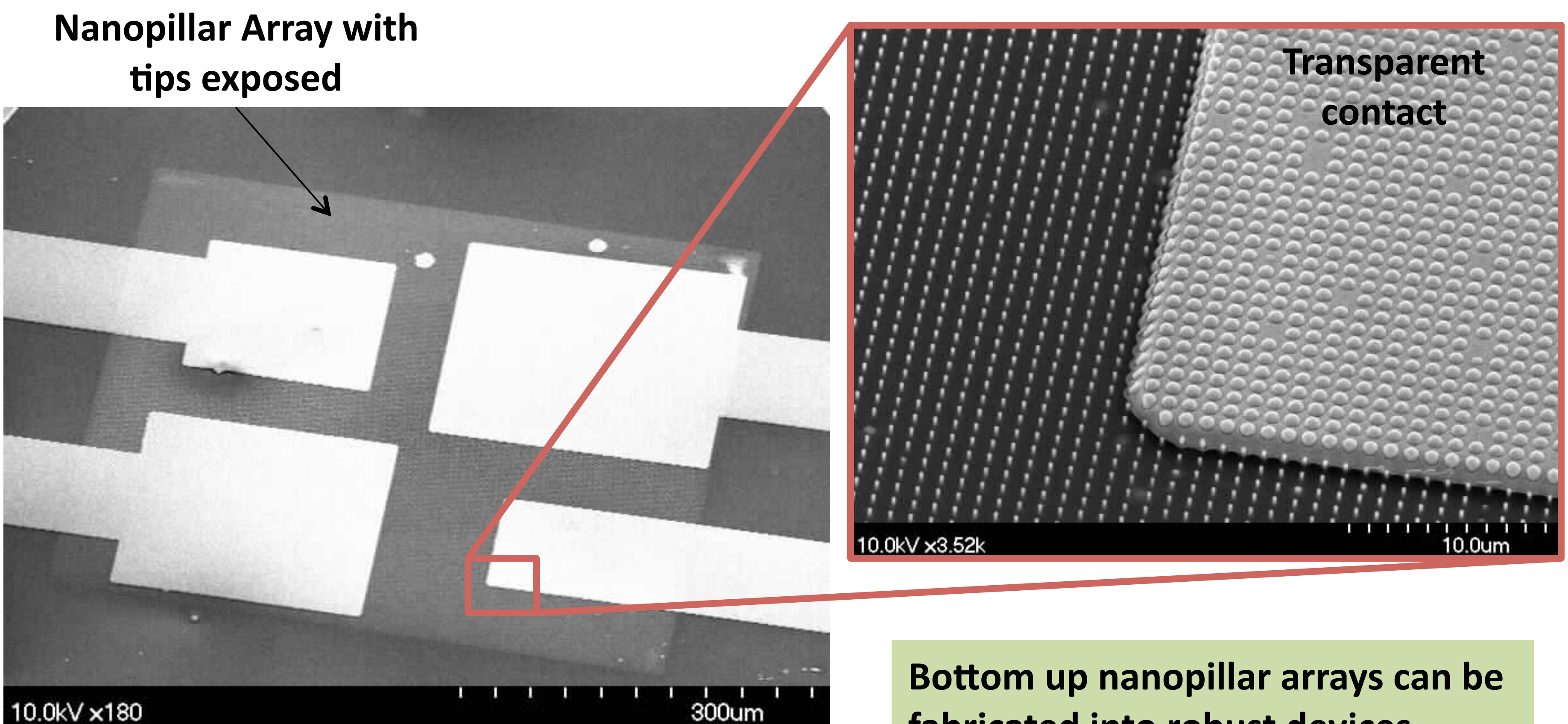
Nanopillar arrays for wavelength tunable high sensitivity photodetectors

Pradeep Senanayake

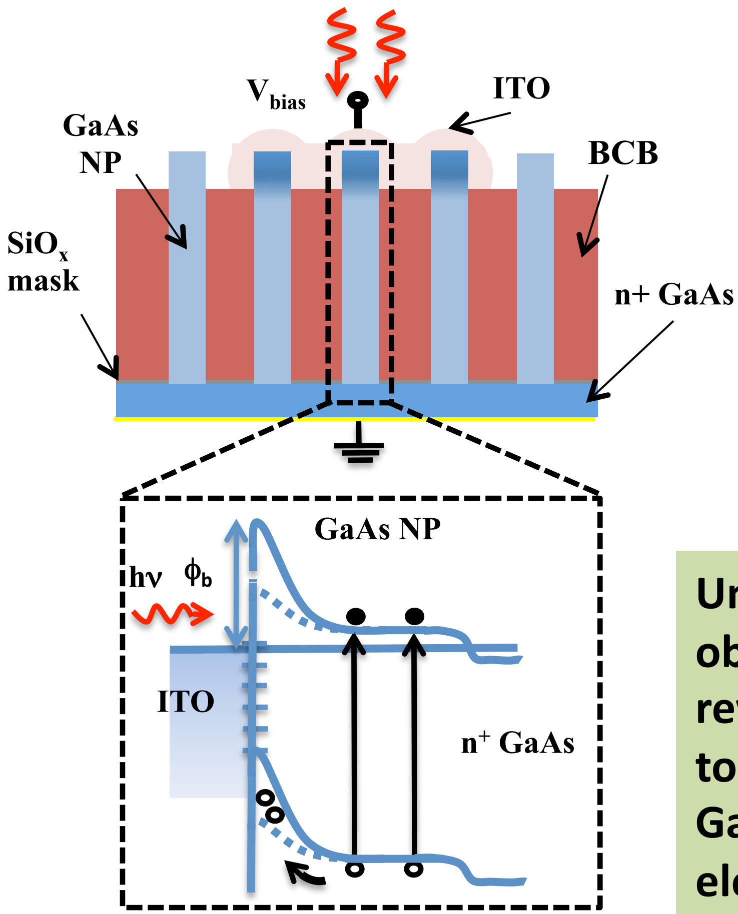
PI: Prof. Diana Huffaker

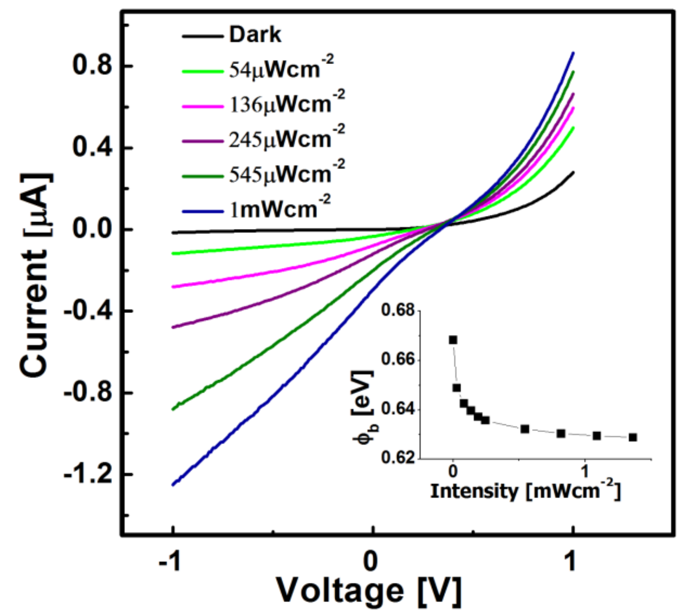
Large area scaling of Nanopillar (NP) arrays for high sensitivity photodetectors



Bottom up nanopillar arrays can be fabricated into robust devices (including photodetectors, LEDs, and solar cells) using polymer planarization and etch back.

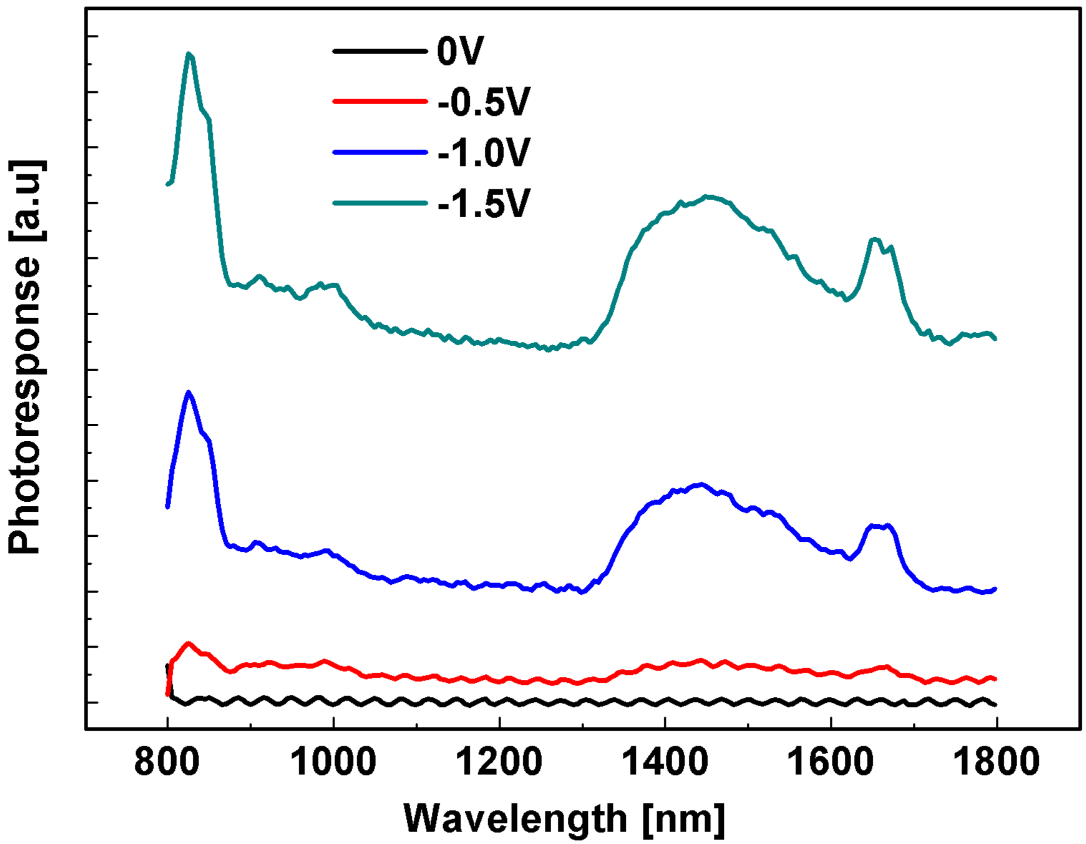
Physics of photoconductive gain in GaAs Nanopillar arrays





Under illumination photoconductive gain is observed in the NP arrays in both forward and reverse bias. Photoconductive gain is attributed to the lowering of the Schottky barrier at the ITO-GaAs interface allowing the collection of multiple electrons per incident photon.

Wavelength tunable photodetectors using $In_xGa_{1-x}As$ Nanopillars on GaAs in the 1.3μm-1.55μm range



Photocurrent from InGaAs nanopillars on GaAs have been measured corresponding to photoluminesce wavelengths at 1.4um. InGaAs nanopillars arrays could be an enabling technology for high sensitivity photodetectors in the fiber optic telecommunication wavelengths.