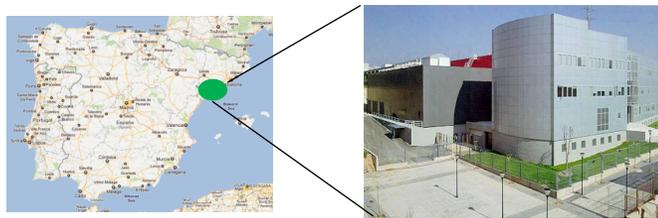


# Silicon nitride platform for photonic biosensors

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## Clean Room Characteristics

1,500 m<sup>2</sup> (2,900 m<sup>2</sup> services)

“House in House” structure

Clase 100-10,000 (ISO 5-7)

Wafer size: 100-150 mm

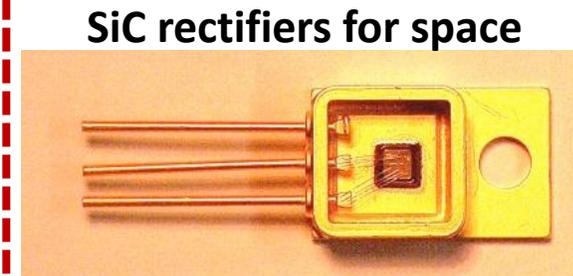
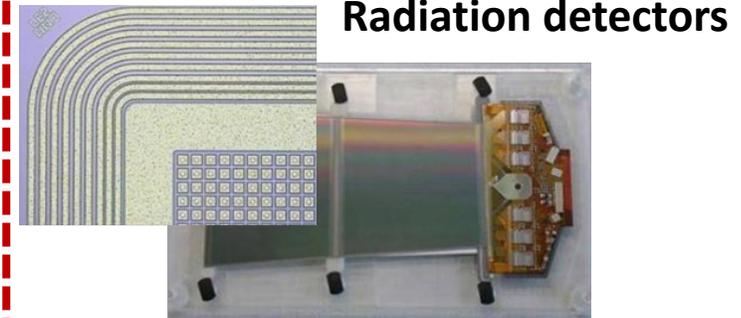
I-Line Stepper + EBL.

CMOS ICs  
MEMS/NEMS  
Nanofabrication

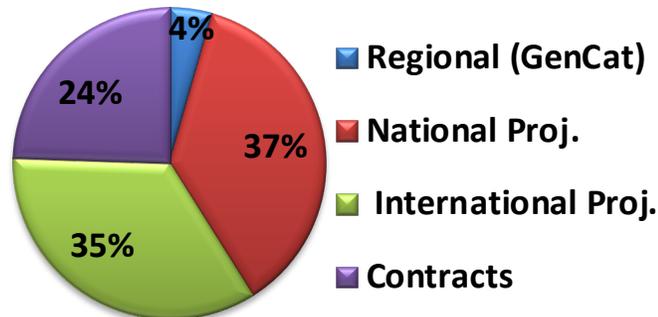
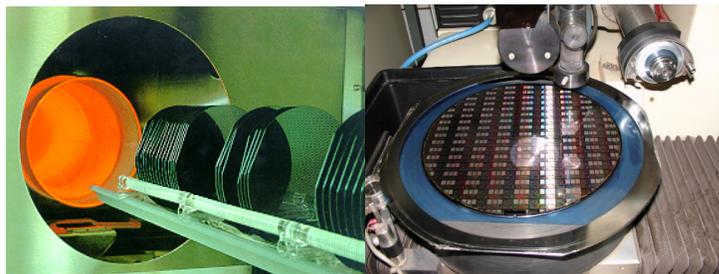
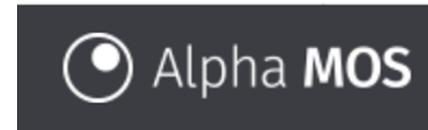
TRL 2 to TRL 9 (concept → market)



## Industrialized technologies



## Chemical sensors ISFETs



# SiN Photonic Platform

Wavelength range from Visible to Mid infrared.

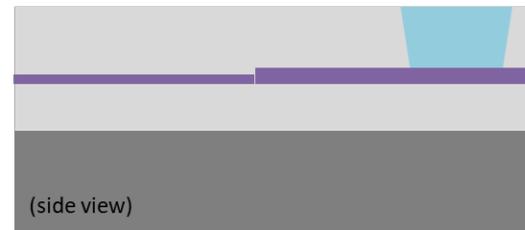
Three waveguide cross-sections (nitride films 300/340 nm height, shallow 150/300 nm, deep 300 and mini-deep 150 nm)

Thermo-optic tuners (Cr/Au, Poly-Si, Al-5% Cu...High flexibility)

Selective area trenching: integration Biosensors+PICs.

MPW fabrication approach.

VIS



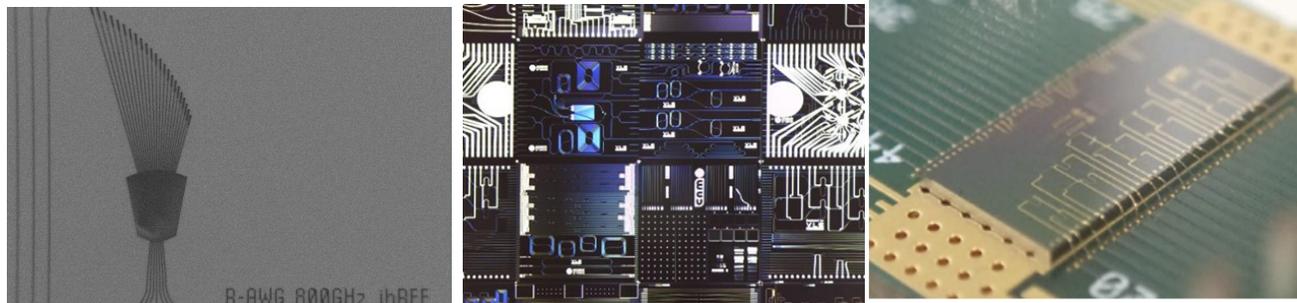
NIR



VIS-NIR-MIR



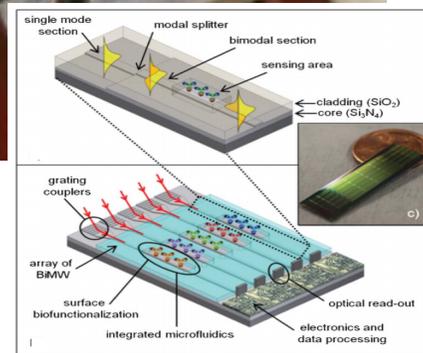
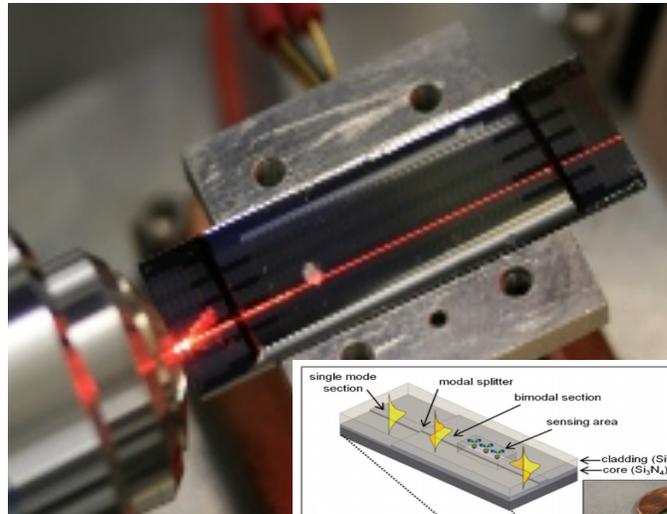
UNIVERSITAT POLITÈCNICA DE VALÈNCIA



The European Silicon Photonics Alliance

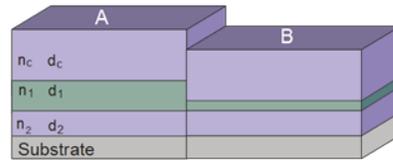
# SiN platform examples on biosensing application

## Bimodal interferometer

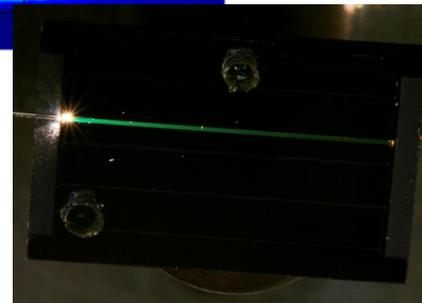
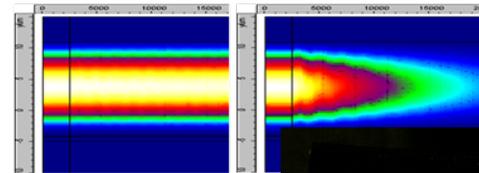


K. E. Zinoviev, et al. (2011) DOI: 10.1109/JLT.2011.2150734.

## Fluorescence Biosensor with integrated filter

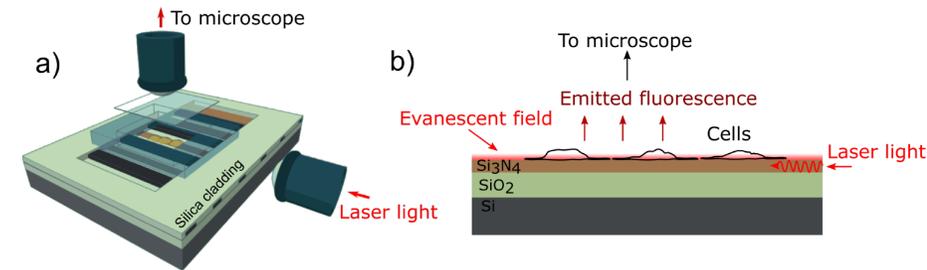


Join Propagation Length      Wavelength Filter

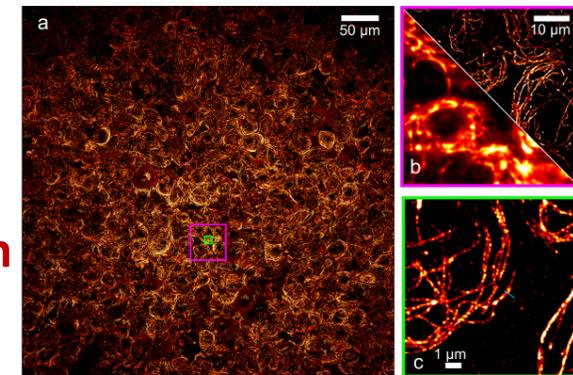


A. Llobera, et al. Optics Express, Vol. 19 (6), pp. 5026-5039 (2011). DOI:10.1364/OE.19.005026

## Nanoscopy based on Total Internal Reflection Fluorescence (TIRF)



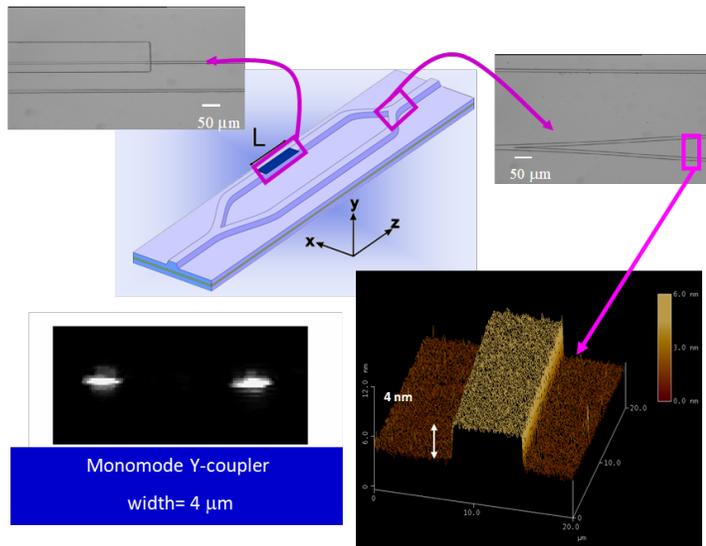
**Industrialization process.**



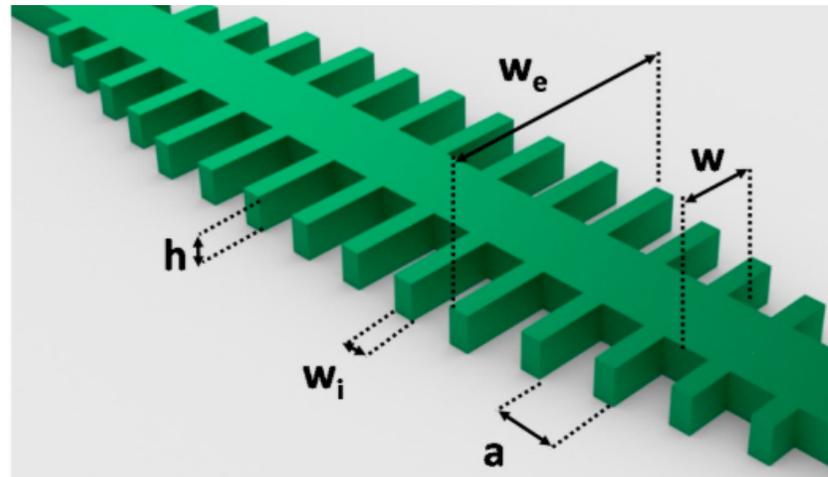
Ø. I. Helle, et al. Optics Express, Vol. 27 (5), pp. 6700-6710 (2019). DOI:10.1364/OE.27.006700

*Thank you very much*

Mach-Zehnder Interferometer



PBG 1D photonic crystal



Ring Resonator

