

SILICON PHOTONICS AS AN ENABLER FOR HEALTH CARE APPLICATIONS



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EPIC Online Technology Meeting on Medical Devices for Surgical Procedures

MICRO-CHIPS: KEY FOR COMPACT AND LOW-COST MEDICAL DEVICES



Pacemaker

Electronic IC's



Infrared fever thermometer

Mid-IR detector chip

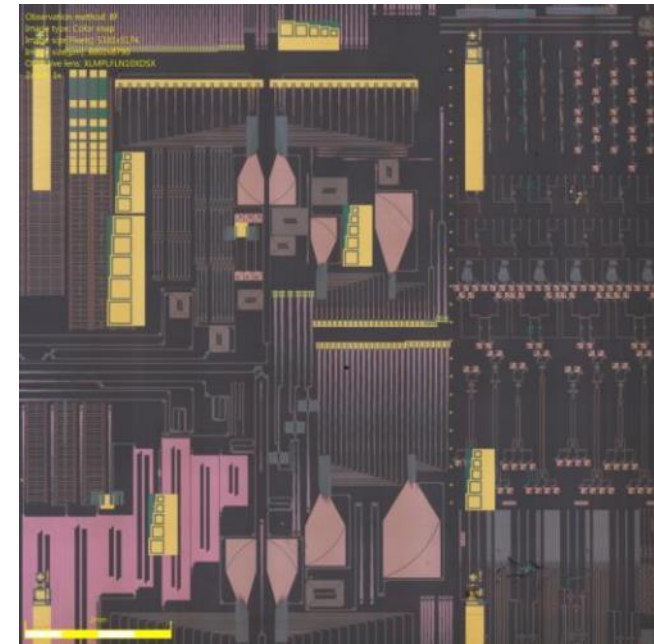


Pulse Oximeter

Near IR LED and detector chips

FUTURE: SILICON PHOTONICS

The implementation of high density photonic integrated circuits by means of CMOS process technology in a CMOS fab



Pictures, courtesy of imec

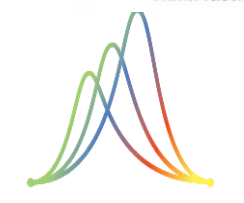
Enabling complex optical functionality on a compact chip at low cost

TRANSCEIVERS FOR DATA CENTERS AND FOR TELECOM

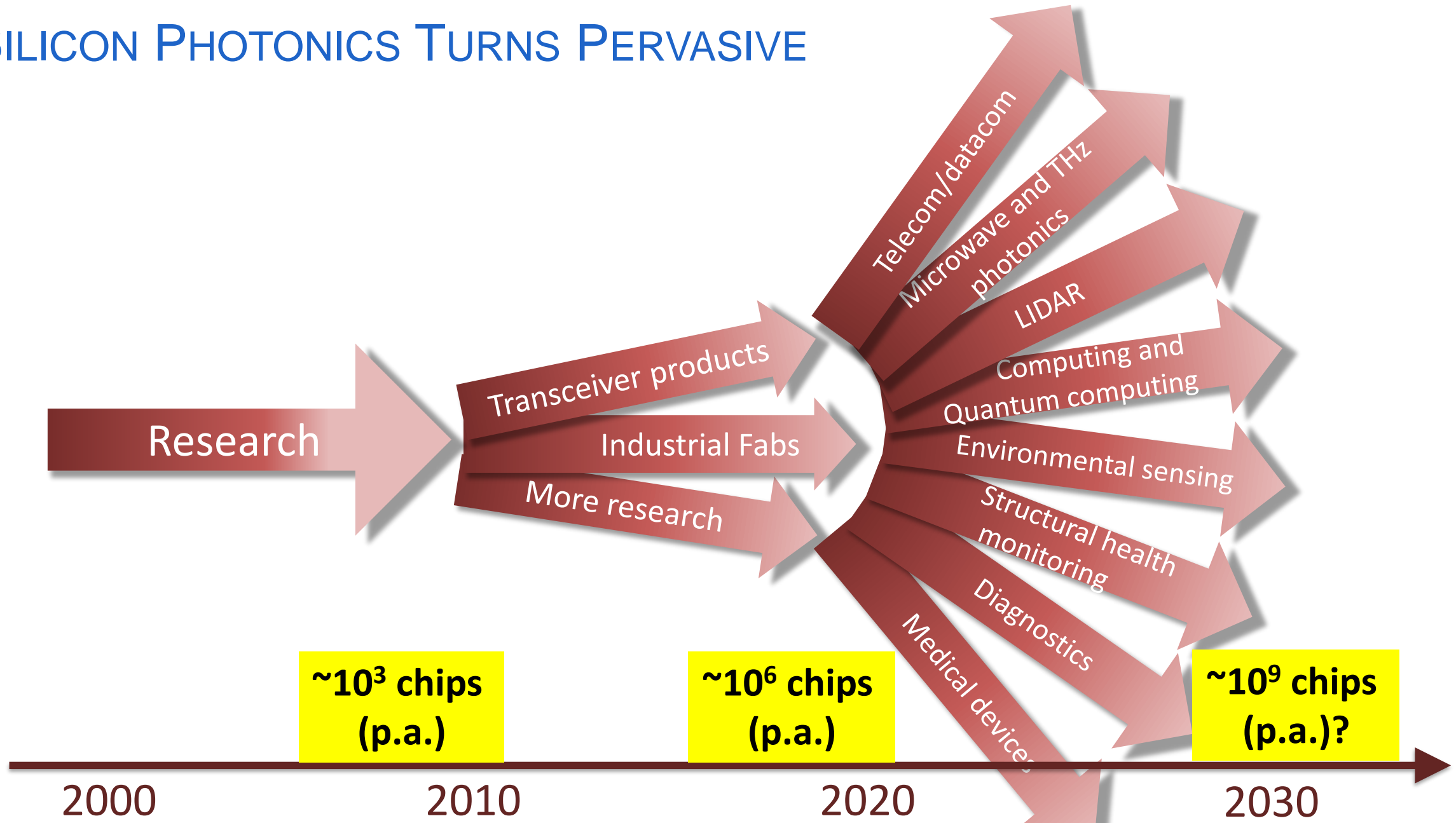


Under development:
Data rate: 800 Gb/s
Symbol rate: 100 Gbaud

- Typical data rate: 100-400 Gb/s**
Typical symbol rate: 25-50 GBaud
- PSM4 (4 parallel fibers)
 - WDM (4 wavelengths)
 - PAM4
 - Coherent (2 polarisations + QPSK)
 - Coherent (16-QAM)



SILICON PHOTONICS TURNS PERVASIVE



ASSETS OF SILICON PHOTONICS FOR MEDICINE AND HEALTH CARE

Rich set of sensing modalities

Sensing without physical contact

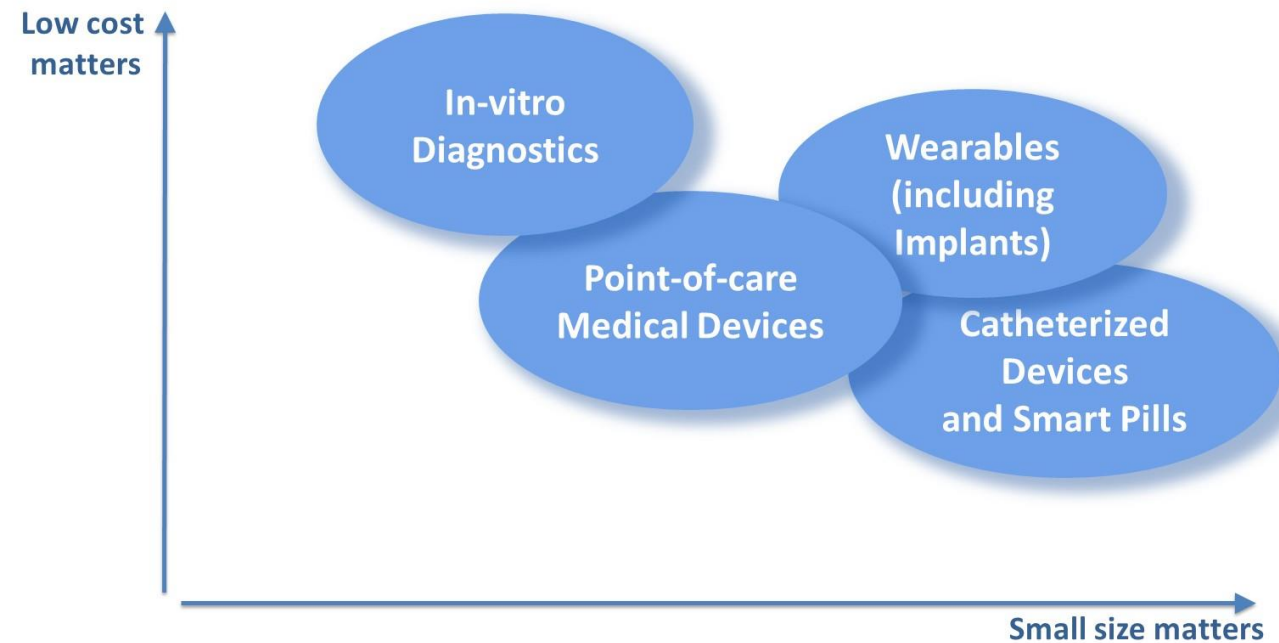
Low cost (even in moderate volume)

Disposable (use-once) devices

Very compact devices (even small enough for bodily implants)

Can address needs from visible to mid IR

Mature supply chain



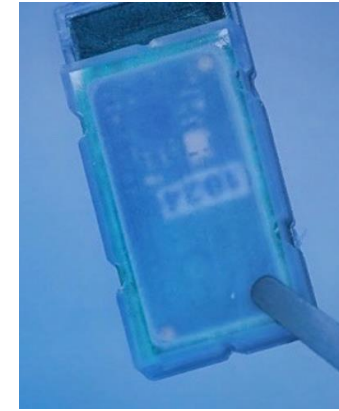
EMERGING SILICON PHOTONICS PRODUCTS FOR HEALTH CARE



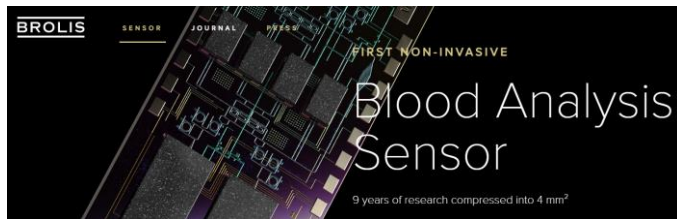
Immuno-assays



Diagnostics for home use



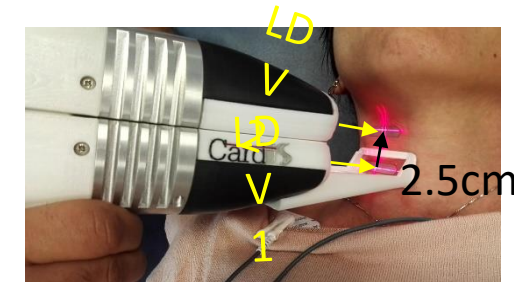
Continuous glucose monitoring



Blood analysis sensor



Multi-functional smart-watch sensor



Cardiovascular monitoring

SUMMARY

Silicon photonics:

Mature technology in CMOS-fab, low cost

Strong industrial traction for telecom/datacom applications

Emerging development of health care products