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Radboud Universiteit



Radboudumc



WAGENINGEN
UNIVERSITY & RESEARCH

EPIC ONLINETECHNOLOGY MEETING
EXPLORING EMERGING APPLICATIONS FOR PHOTONIC
INTEGRATED CIRCUITS

VCF DUPRE, BDM AGRI & FOOD VINCENT.DUPRE@IMEC.NL

ONEPLANET RESEARCH CENTER

UNIQUE COLLABORATION

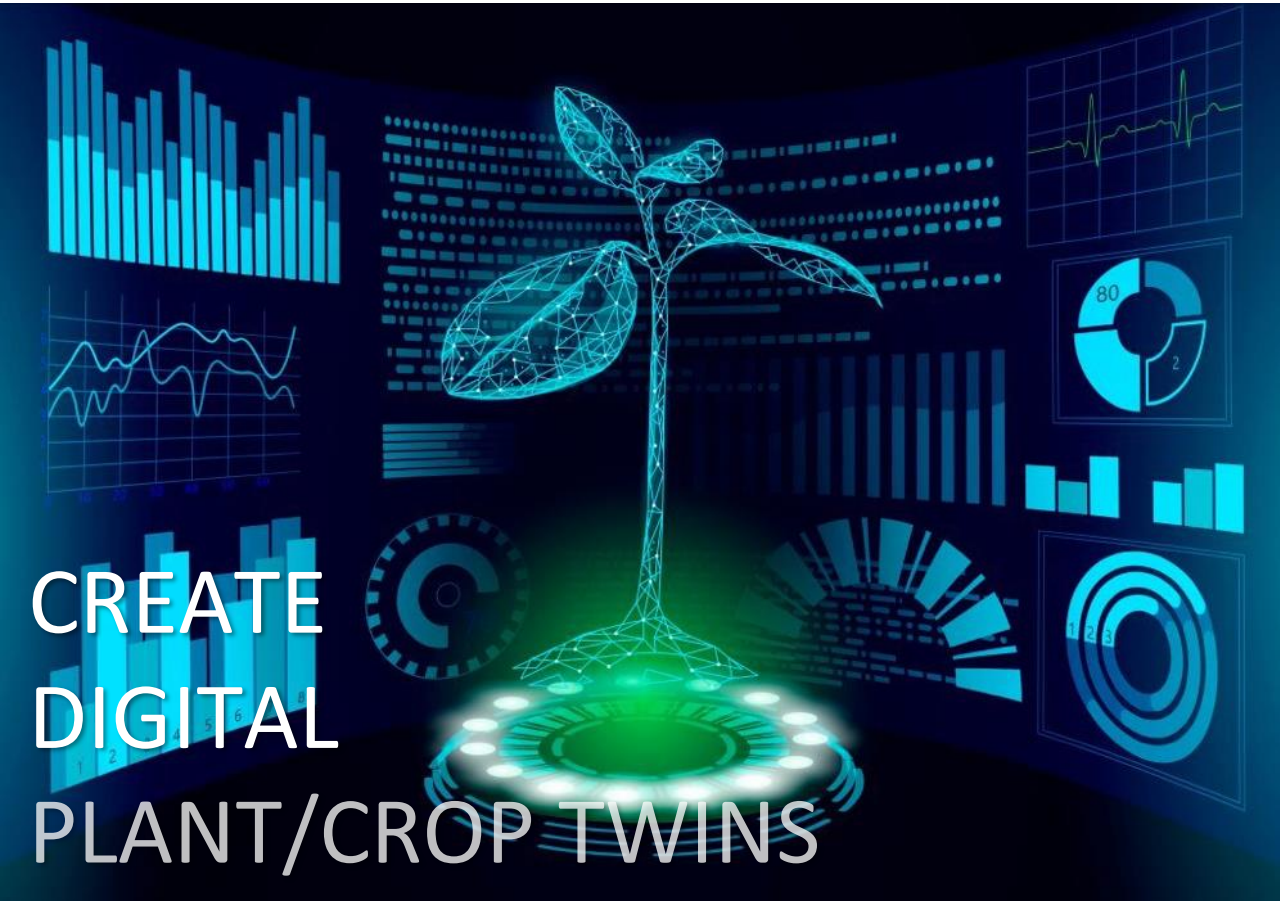


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imec, Wageningen University & Research,
Radboud University and Radboudumc

EPIC Online Technology Meeting
Exploring Emerging Applications for Photonic Integrated Circuits
Vincent Dupre – BDM AgriFood: Vincent.Dupre@imec.nl

TOOLS → DATA → INSIGHT

**THROUGH THE CREATION
OF DIGITAL TWIN
ANALYTICS MODELS**



**CREATE
DIGITAL
PLANT/CROP TWINS**

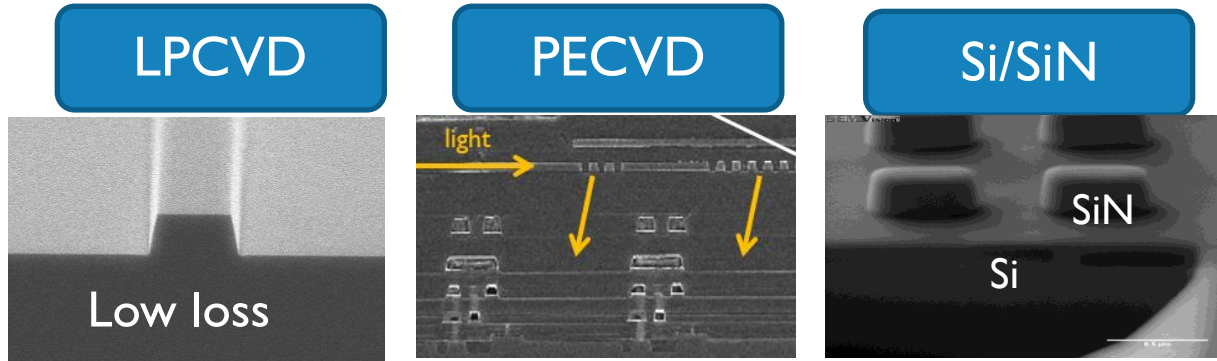


**CREATE
DIGITAL
HUMAN TWINS**



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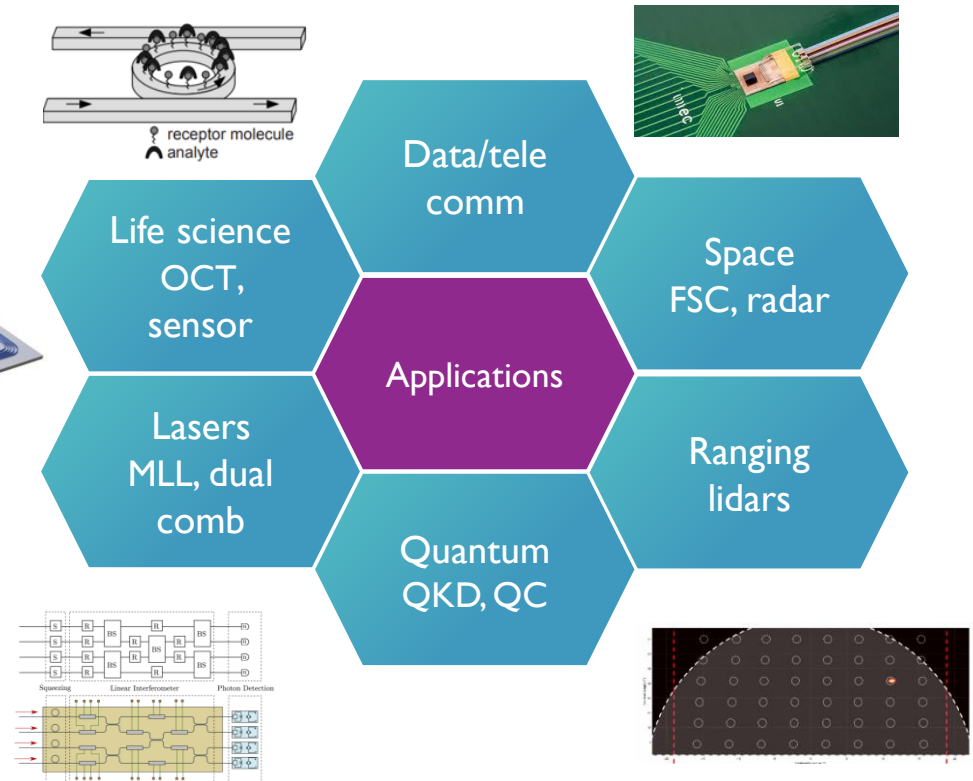
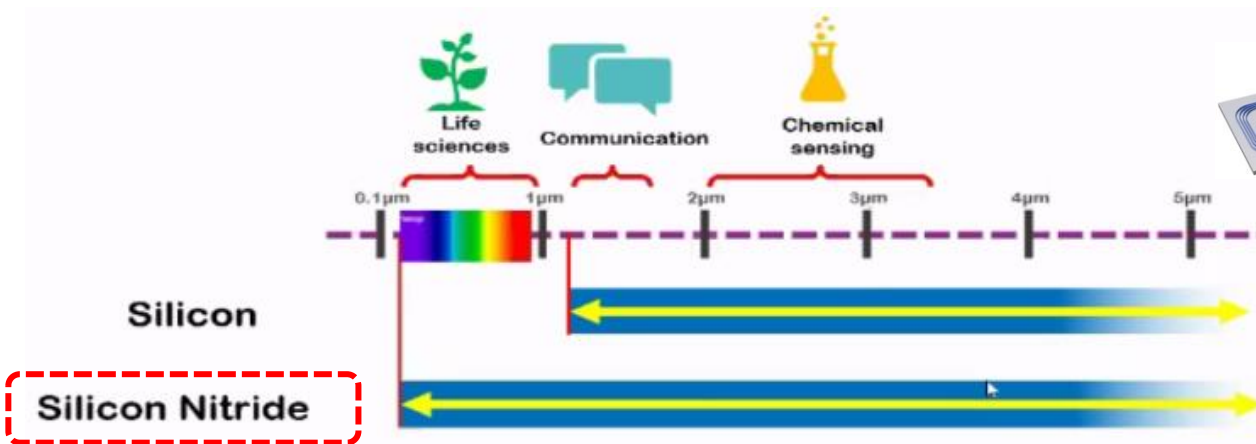
SILICON NITRIDE PHOTONIC: LOW LOSS, HIGH POWER, HYBRID INTEGRATION



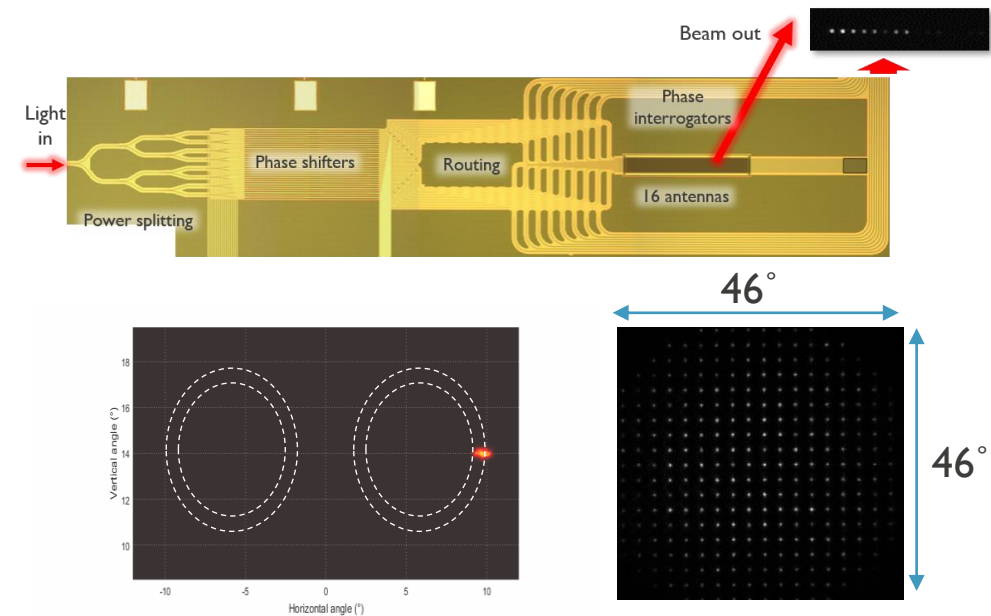
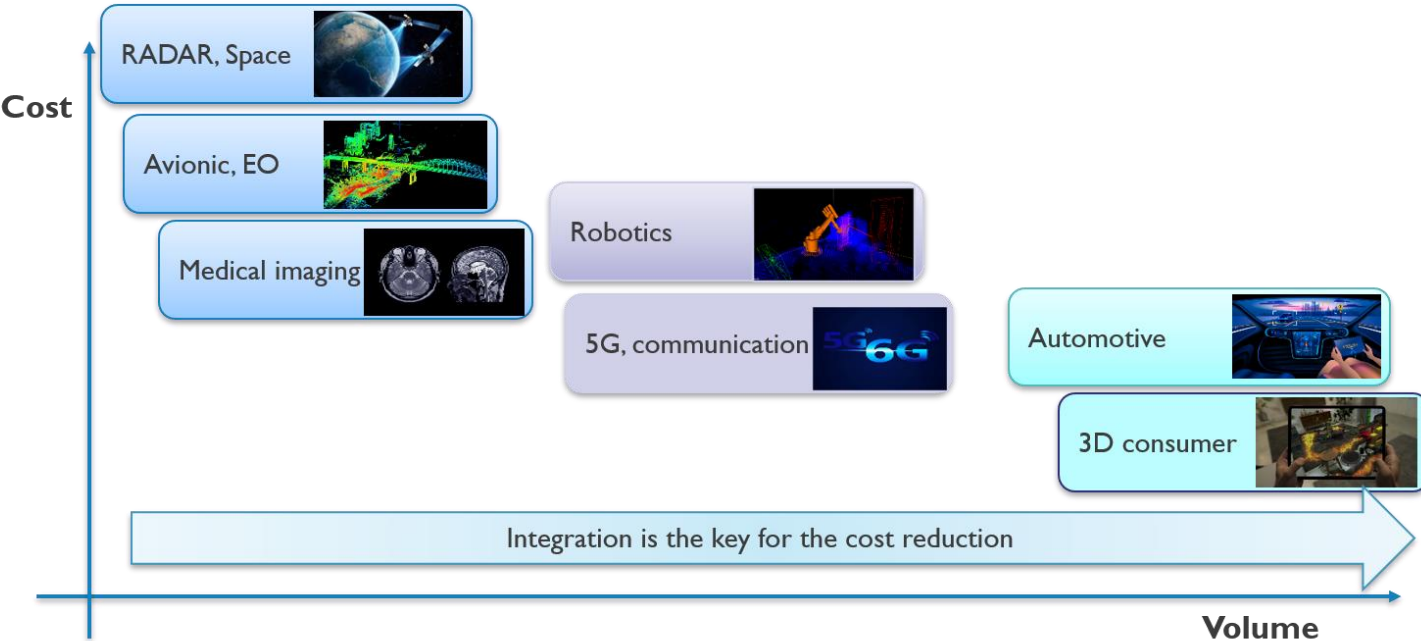
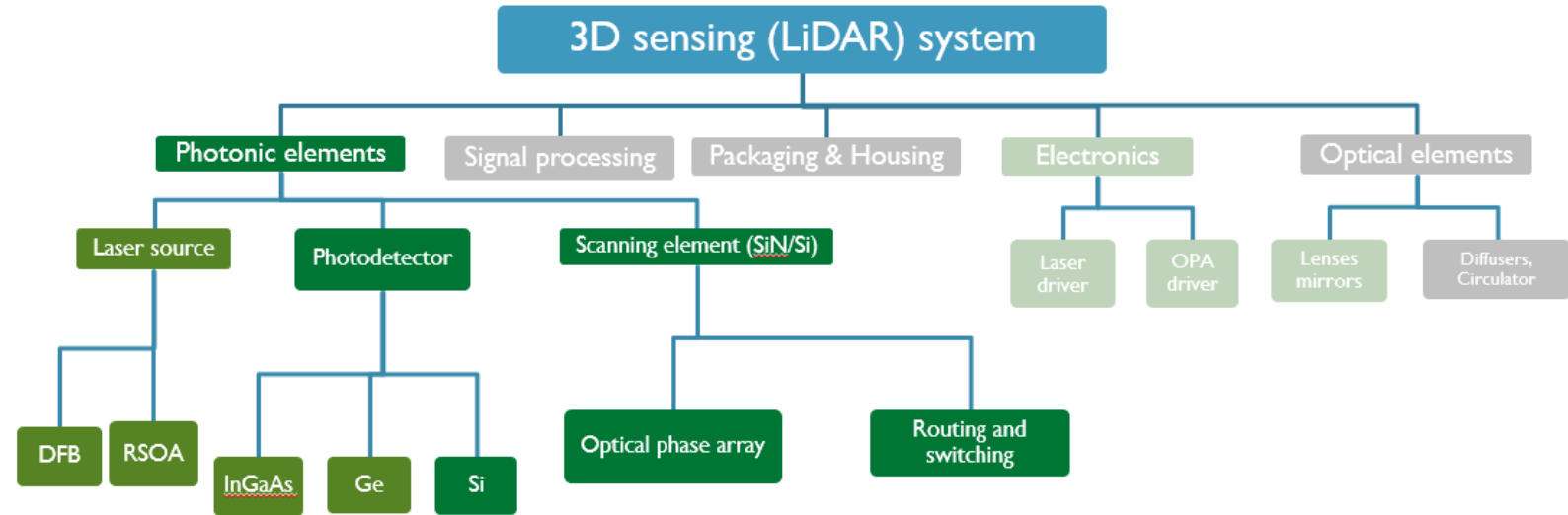
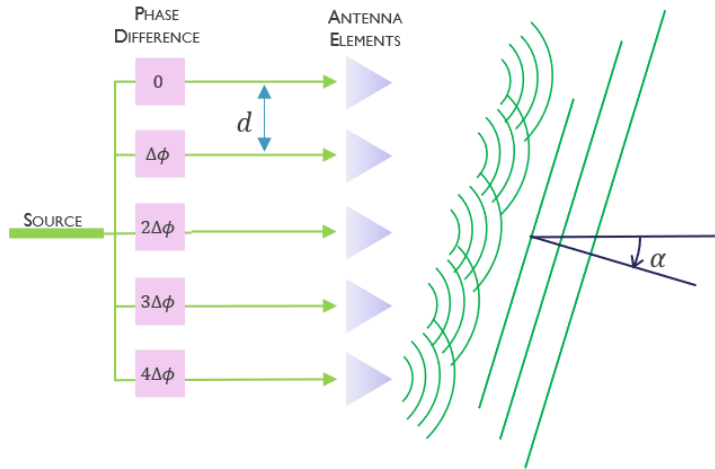
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feature	SOI (Si photonics)	SiN (LPCVD/PECVD)
Transparency	1.1 to 4.2 μm	400 nm to 4.2 μm
Power handling	≈ 20 dBm	> 30 dBm
Waveguide loss	≈ 2 dB/cm	< 0.1 dB/cm

- ✓ Imec is integrated photonic technology house:
 - ✓ Volume scale production line (200 mm & 300 mm)
 - ✓ Design and system expertise
 - ✓ Technology photonic R&D center



OPTICAL BEAM-FORMING: COMPACT, FLEXIBLE, LOW COST



Harvesting
Shelf-life
Storage
Assisted operations
Agronomic advise
Prototyping
Biomass
Insect damage
Sugar content
Moisture

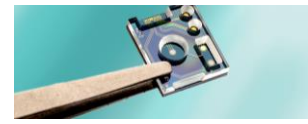
Applications

Continuous non-intrusive sensing
 Mental Wellbeing
 Nutrition
 Improved eating behavior
 Increased wellbeing
Early diagnostics

Digital
Platforms



Emerging sensing technology



RESEARCH PROGRAMS

NUTRITION & HEALTH



NUTRITION &
METABOLIC
HEALTH



NUTRITION &
MENTAL
WELLBEING

HUMAN DIGITAL TWIN

INGESTIBLES

SMART BATHROOM

CITIZEN NUTRITION

AGRIFOOD & ENVIRONMENT



AUTONOMOUS
FARMING



DIGITAL FOOD
FACTORY OF
THE FUTURE

EMERGING SENSING

DIGITAL TWIN

ENVIRONMENTAL IMPACT

AGRIFOOD VALIDATION LAB

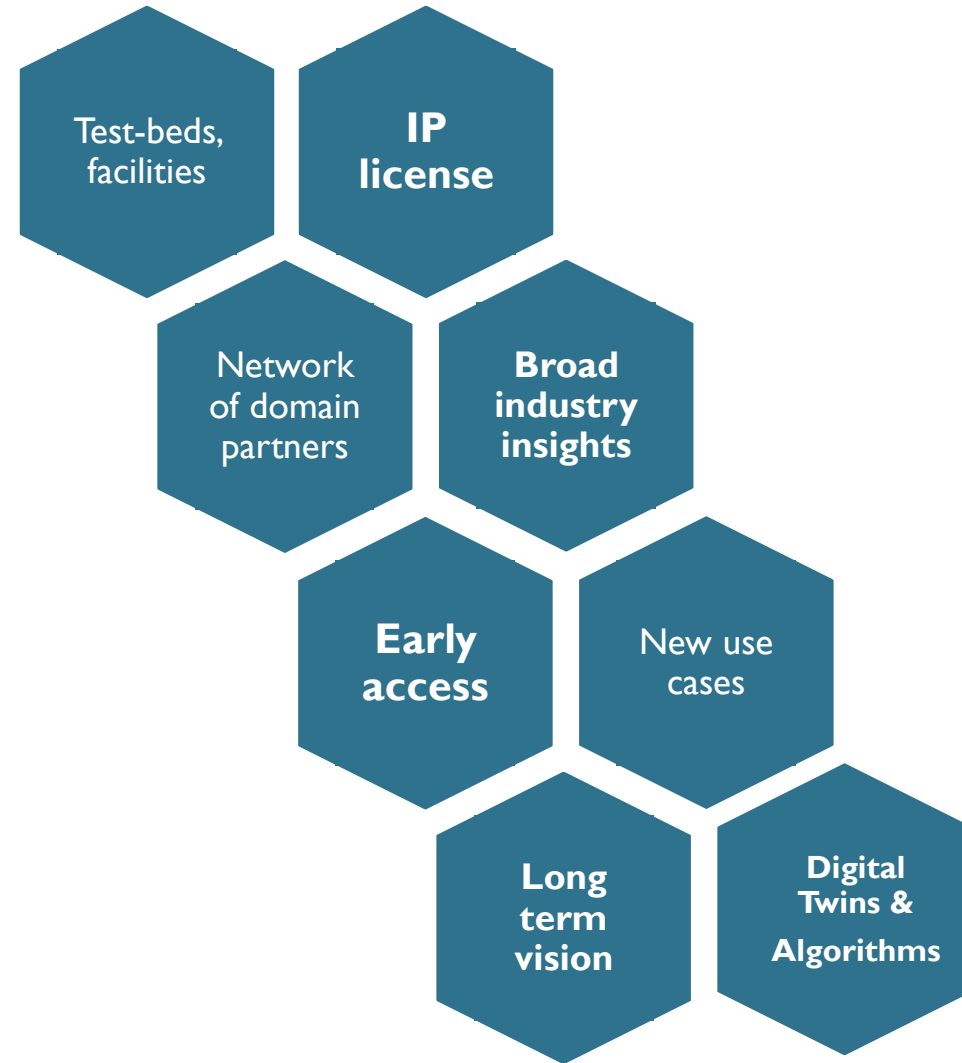
ECO SYSTEM OF KEY SUPPLY-CHAIN PARTNERS

Retail (industry requirements)

Living labs (End-users)

Application partners (OEMs)

Technology partners (Tier 1/2)



ADDED VALUE BY WORKING TOGETHER

TOWARDS THE FUTURE OF AGRICULTURE

- Innovation programs
- Build or grow your business
- Valuable research insights
- Technology integration
- Networking
- OpenEducation
- ExpertSessions

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