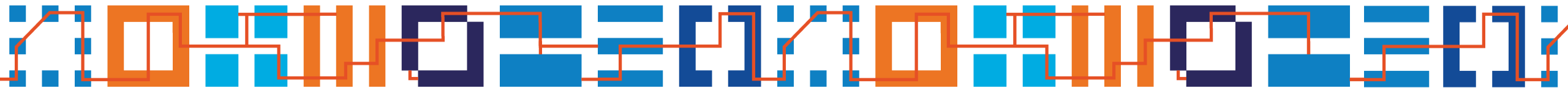# Integration for Tomorrow

CITC
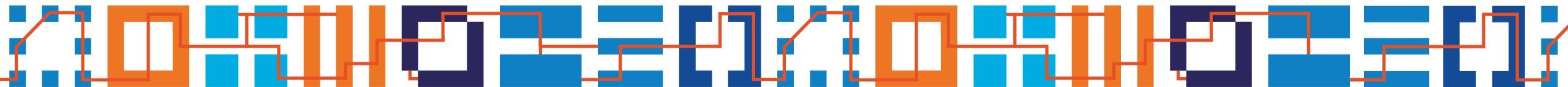
Chip Integration
Technology Center

Introducing CITC: joint innovation center in heterogeneous integration and advanced packaging
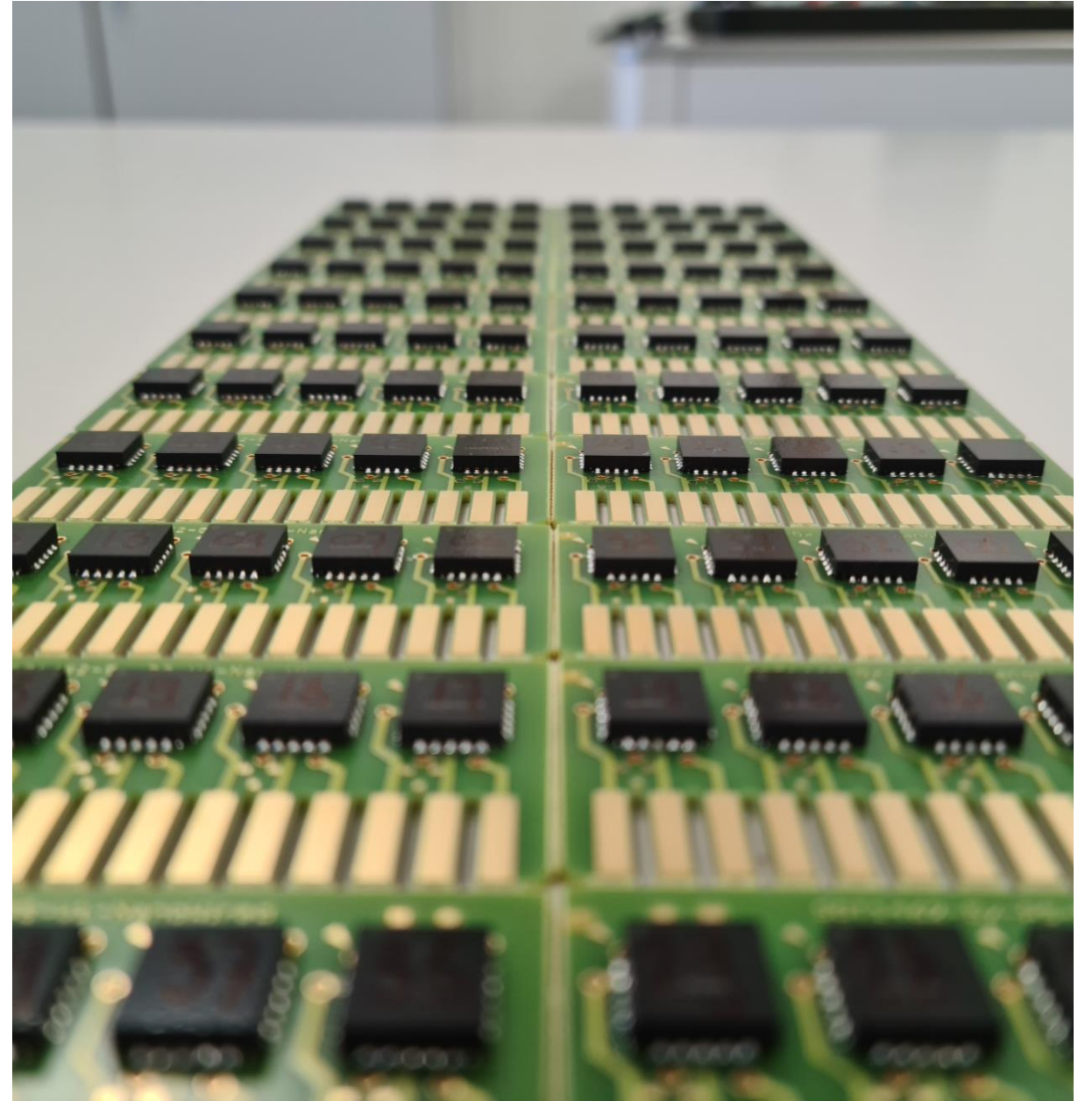
Mark Luke Farrugia

CITC

Chip Integration
Technology Center

About CITC: who we are

- Joint innovation center founded in 2019

- Initiative of NXP, Nexperia and Ampleon

- Powered by TNO and TU Delft

- Located at Noviotech Campus, Nijmegen

About CITC: what we do

- Development of enabling technologies for semiconductor and photonics packaging

- Create ecosystem to accelerate innovation in key application areas:
  - Power electronics
  - RF and mmWave
  - Photonics

- Education and training
  - Semiconductor Packaging University Program
  - Internships and graduation/PhD assignments
  - Enthuse the young
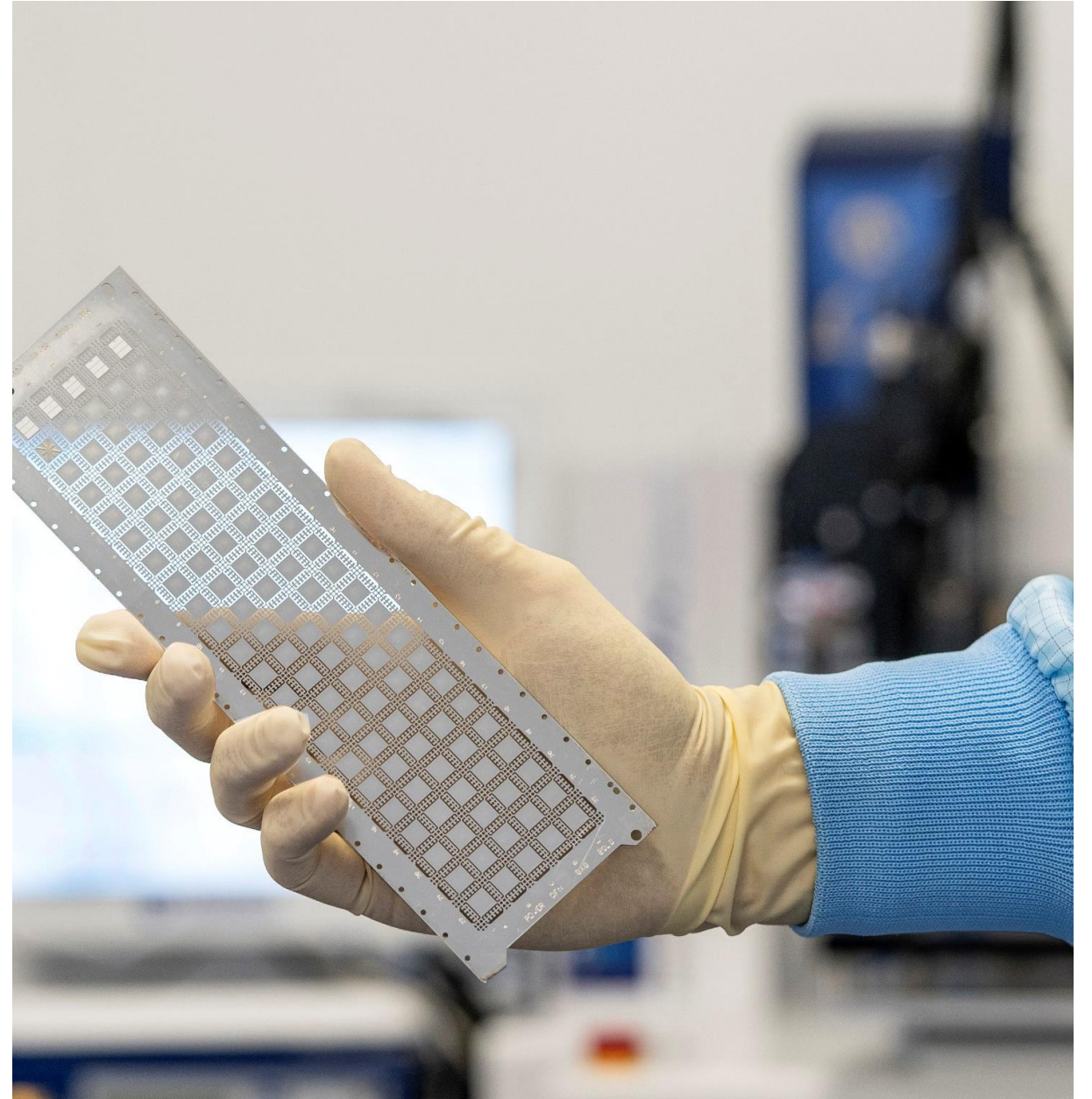
Noviotech Campus

Site sharing

- 70+ companies
- 3,400+ professionals
- HQs of major semiconductor companies

CITC facilities

- R&D labs
- Offices
- Complete infrastructure for back-end assembly

CITC ecosystem: partners across the value chain
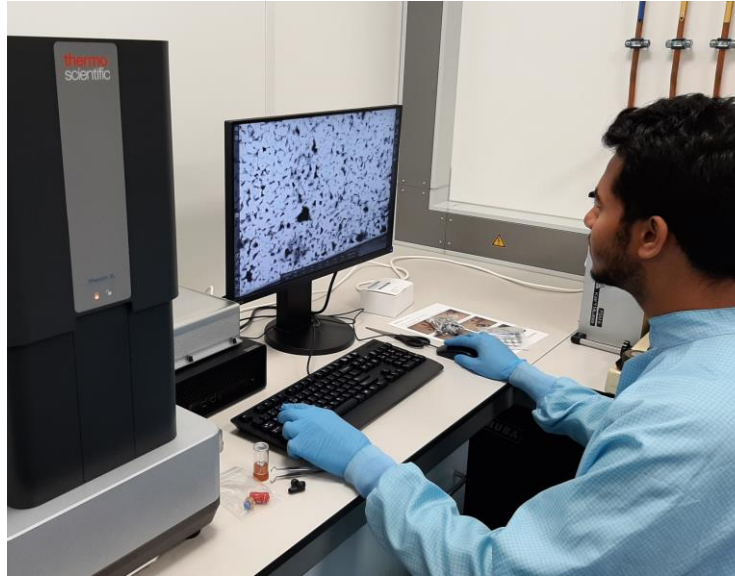
About CITC: what we offer
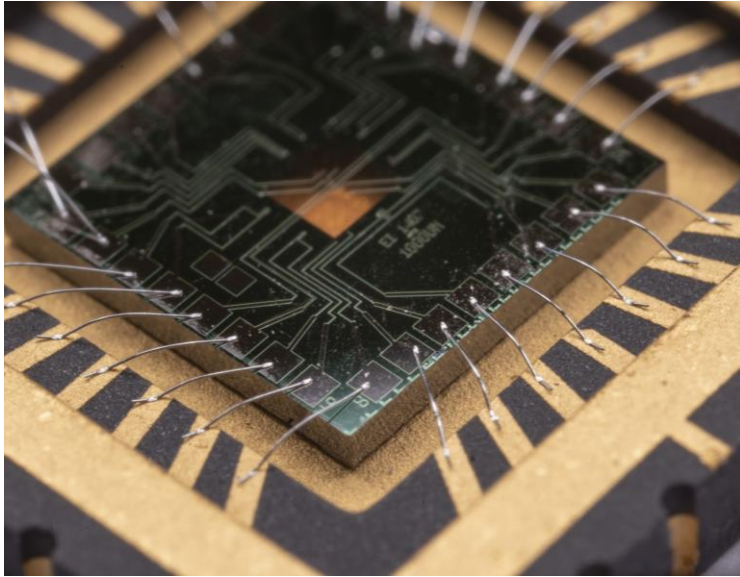
Access to innovation

- 2- up to 5- year research programs
- Together with partners

Access to infrastructure

- Facilities support innovation and education programs
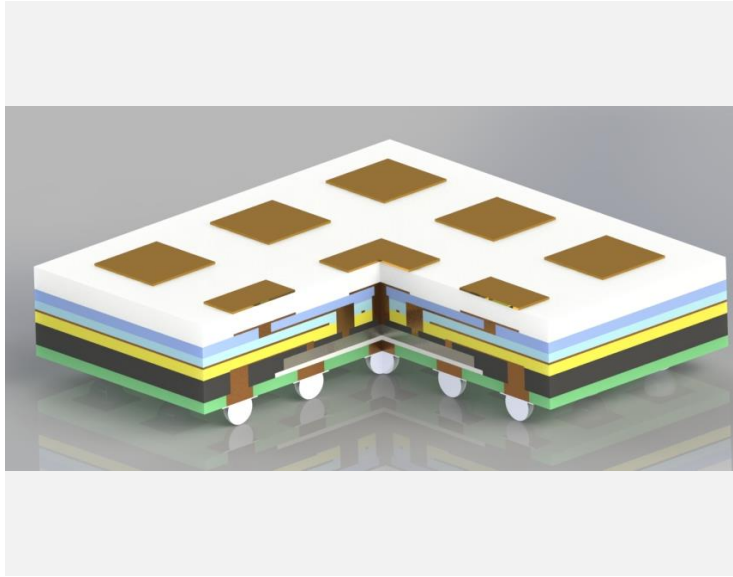- Demo and application lab
- Available to third parties

Access to education

- Targeted education and training for young talent
- Together with companies and educational institutes

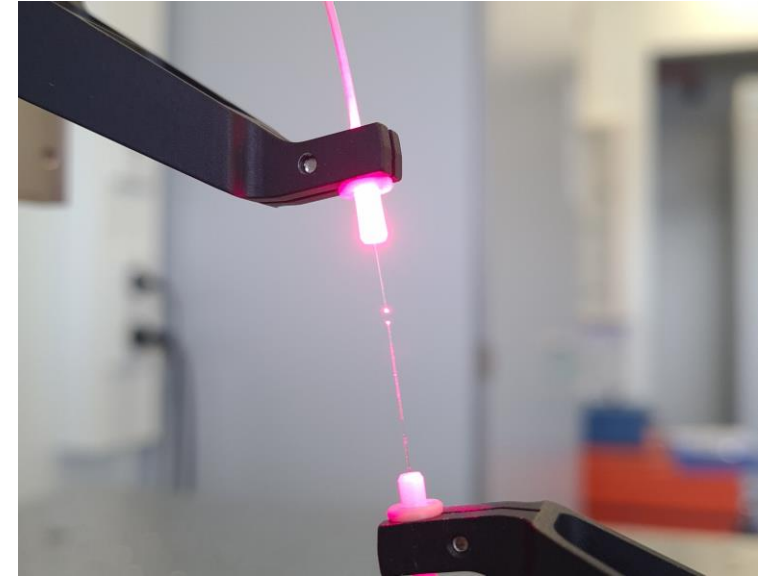# Access to innovation – innovation programs

Thermal high-performance

RF: mmWave and AiPs

Integrated photonics

Thermal high-performance

- Enabling next generation of:
  - High thermal performance packaging concepts

- Technology development for:
  - New die attach solutions suited for SiC and GaN with improved thermal performances

- Application areas:
  - Power electronics

RF: mmWave and AiPs

- Enabling next generation of
  - mmWave applications

- Technology development for:
  - High-performance RF system and integrations of antenna in package

- Application areas:
  - 6G
  - Automotive radar
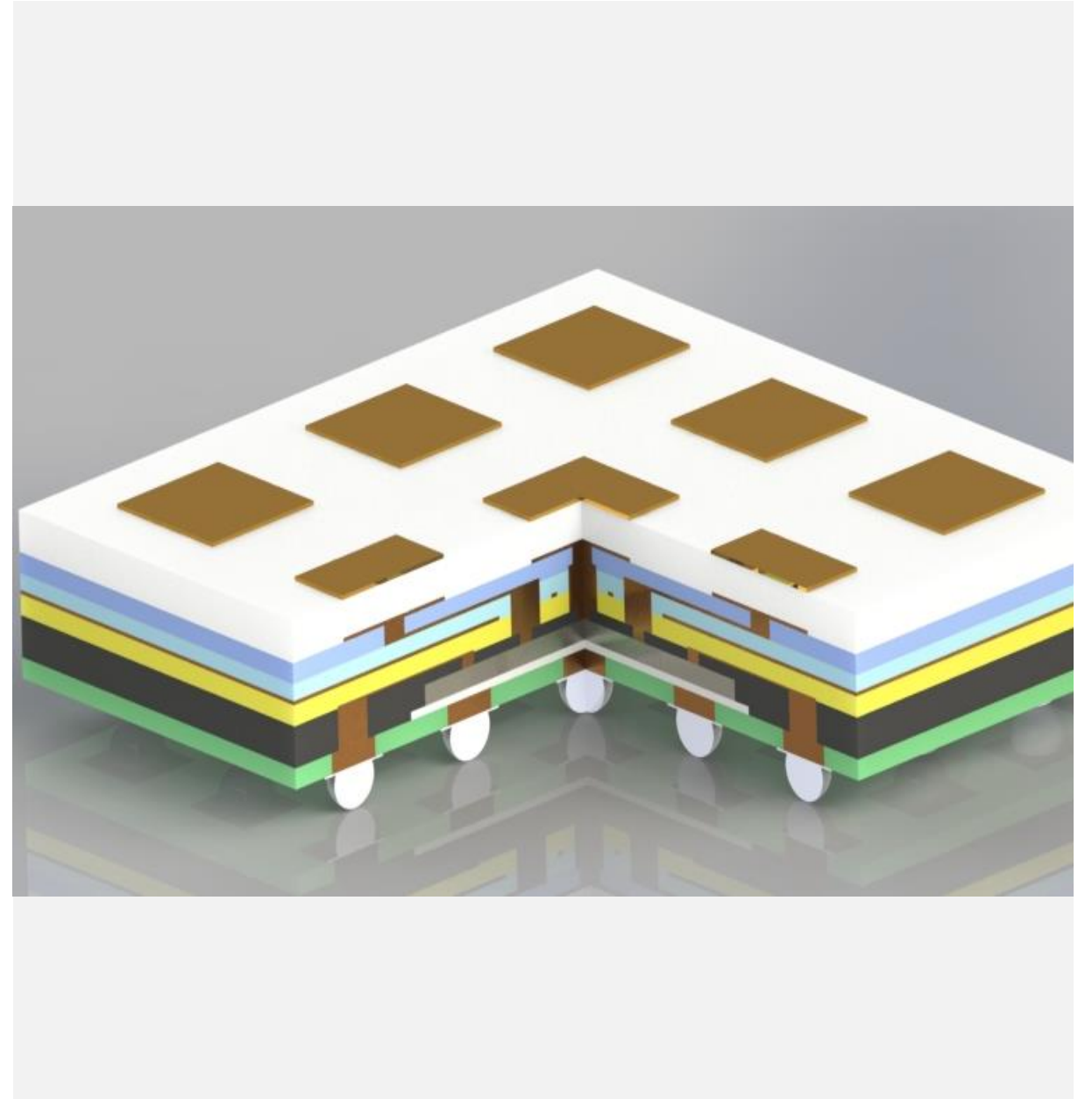
Integrated photonics

- Enabling:
  - Low cost / high-volume photonic packaging

- Technology development for:
  - High-performance passive alignments of photonic elements

- Application areas:
  - LIDAR
  - Data storage
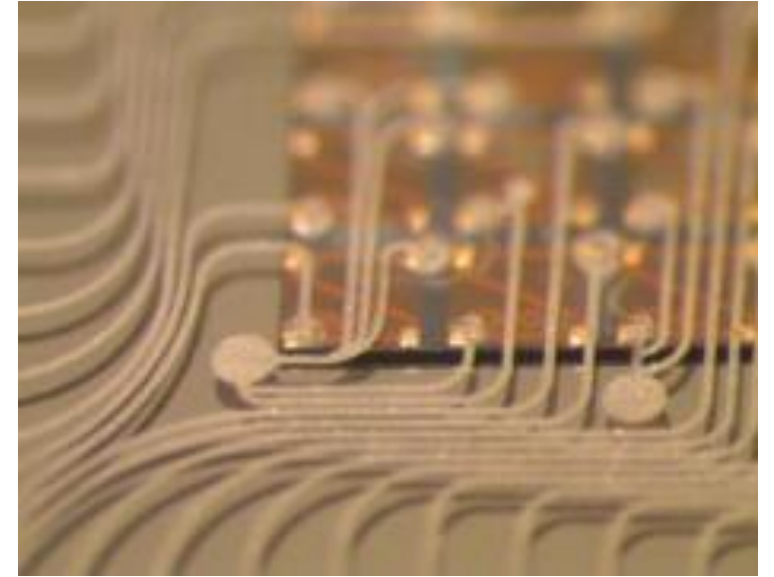 - Sensing
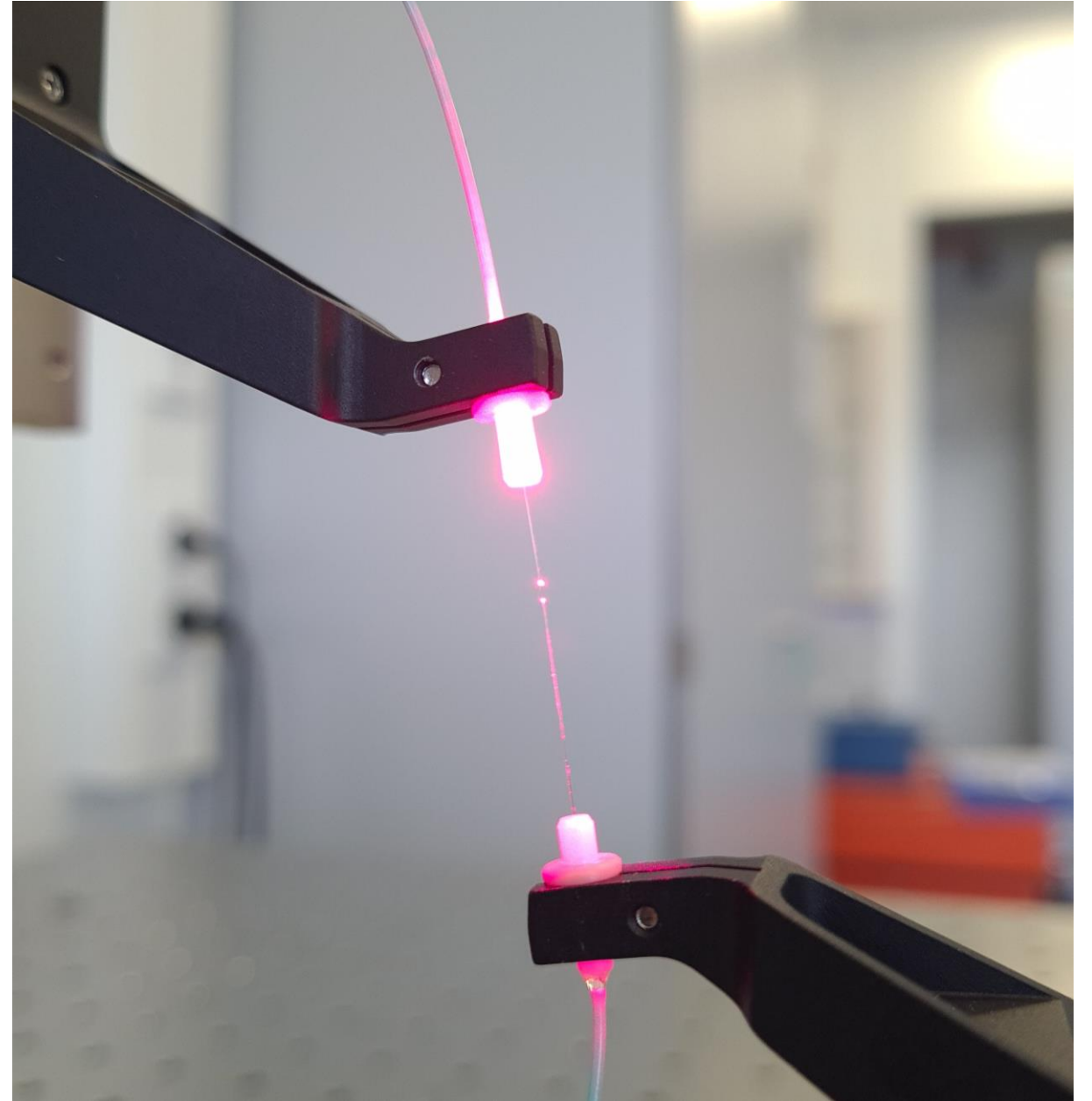
Access to infrastructure

Back-end assembly

- Complete back-end and assembly capabilities: from bare die to packaged device
- Reliability testing

Advanced packaging

- Clean room processing on 32x35 cm^2 panels
- Lithography processing available

Additive manufacturing

- Wide range of printing and 3D printing technologies applied to electronic packaging

Access to education

Semiconductor Packaging minor

- For BSc students and industry professionals
- Theory and practice

Students

- Internships
- Graduation projects
- PDEng and PhD

Enthuse the young

- Primary and secondary school
- Guest lectures
- One-day internships

CITC ambition

CITC is **active** in the fields of:
- Power, RF & Photonics packaging
- Classical, Advanced Packaging and Heterogeneous Integration
- Educating and stimulating the next generation of packaging experts

CITC is **strategically placed** right in the heart of NL's semiconductor packaging hub, connecting players like NXP, Nexperia and Ampleon to the ample academic ecosystem in NL, Europe and beyond

Our ambition is to become a **leading innovation partner** in the fields of semiconductor and photonics **packaging**

- Thus **GROWING the European semiconductor packaging innovation pool** which is essential to Europe's ambition to support & grow small-medium "niche" players as well as attract 'big players' investments in the chip industry, with its own **advanced packaging manufacturing**
- **Innovation** is the key driver to enable **breakthroughs** in **packaging**

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General Manager

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Thank you for your attention!

CITC
Chip Integration
Technology Center