Nicslab: From Personal Innovation to a Global Leader in Semiconductor Solutions

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Co-Founder & CEO

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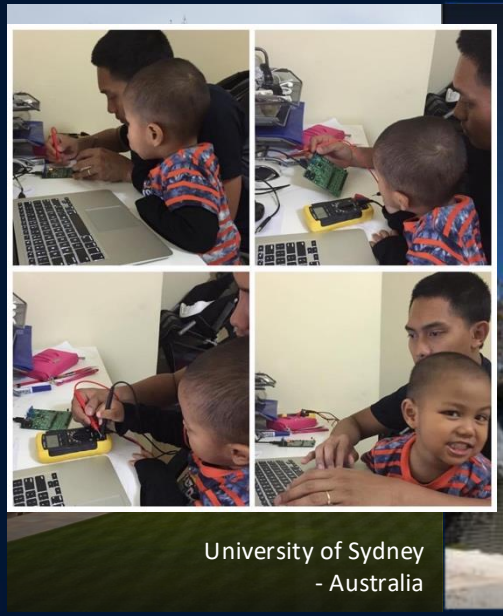
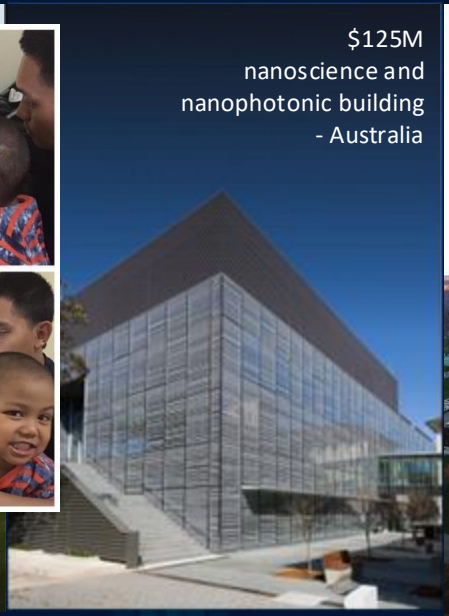
Nicslab Journey

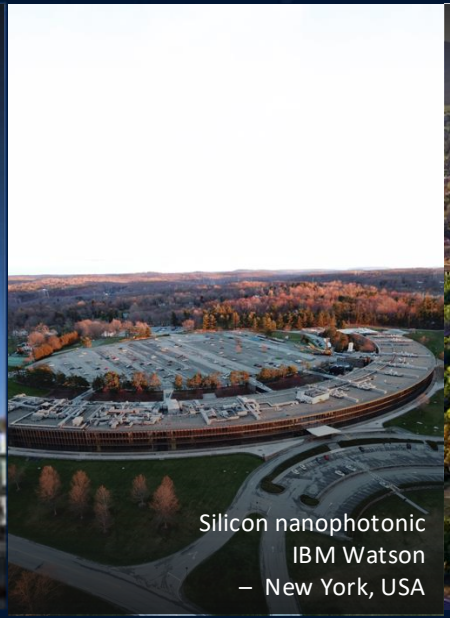
Mission: providing cutting-edge solutions in the semiconductor industry



University of Sydney
- Australia



$125M
nanoscience and
nanophotonic building
- Australia



Silicon nanophotonic
IBM Watson
– New York, USA

Offices in
Palo Alto & Rochester, USA
& Bandung, Indonesia

Current Status :

Shipped products to over 15 countries

Instrumentation

Quantum & AI

Telecommunication & Data Center

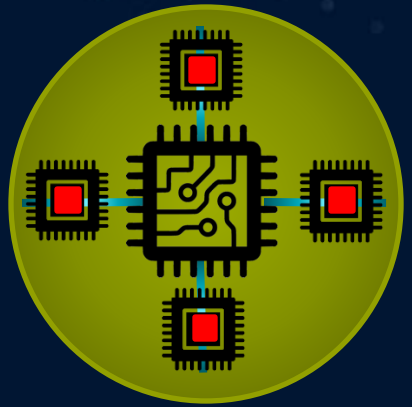
Photonic Integrated Circuits (PIC) :

History of Photonics

First transistor
(1947)

Electronics IC
with billion transistors

Future

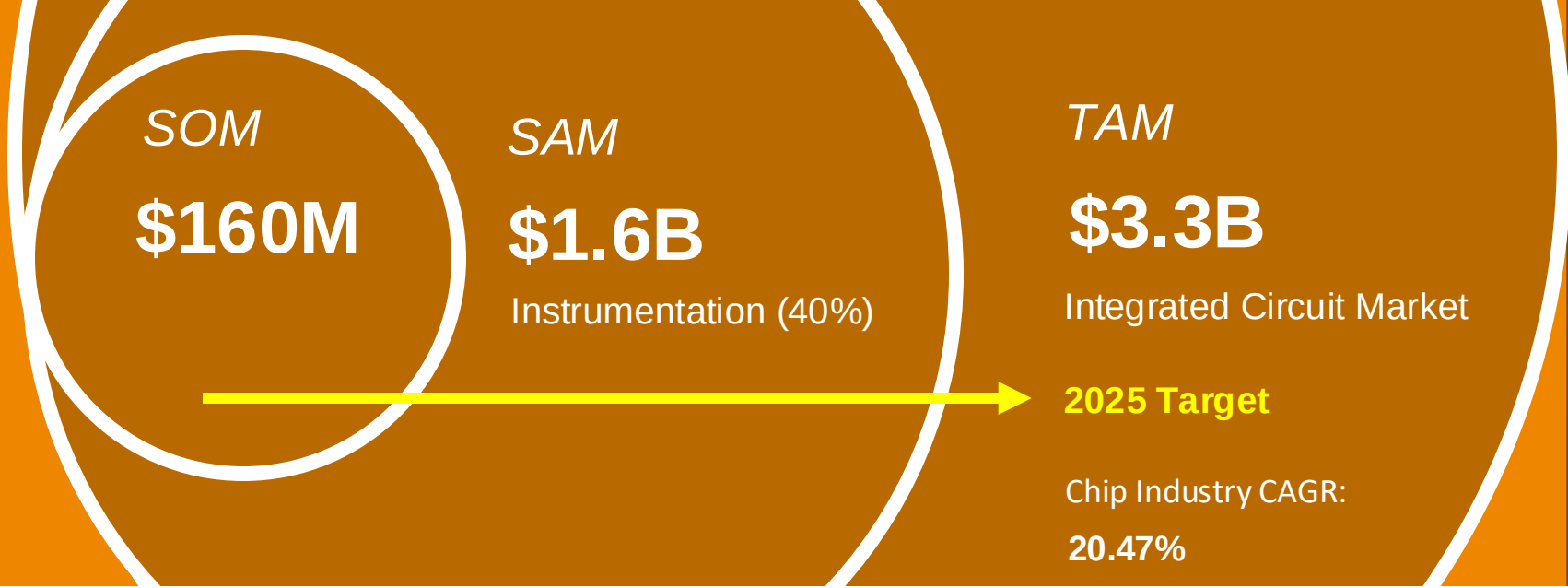


Future

Fiber & optic components

Photonic integrated circuits (PIC)

Enabling disruptive solutions in multiple markets (From data center, telecommunication, AI, Quantum, life science to medical devices)



Market segment

1. Automated Optical, Electrical & High-Speed Test (**20%**)
2. Quantum Photonic R&D (**10%**)
3. Integrated optical beamforming on 5G and beyond (**25%**)
4. AI & Next Gen I/O Photonic Chip Driver (**55%**)

Integrated photonic industry market growth (M/A)

$3.2B deal in 2019

$6.9B deal in 2019

$10B deal in 2020

II-VI INCORPORATED

COHERENT

$7B deal in 2022

$2.3B deal in June 2024

Vision: Become a global semiconductor player

chip scale solution

Today

Tomorrow
(Chip scale version)

Instrumentation

OEM/ODM solution

More advanced system

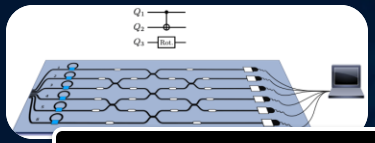
XDAC

Support

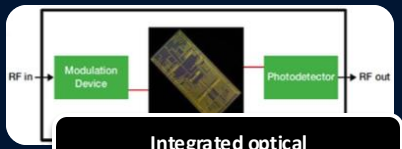
SoC (Core/ADC/DAC/Amp/FPGA)

Investment focus

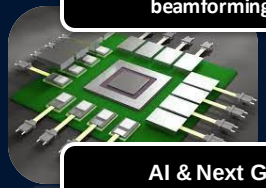
Automated Optical,
Electrical & High-Speed Test



Quantum Photonic



Integrated optical
beamforming (5G>)



AI & Next Gen I/O
Photonic Chip Driver

Scientific publications using our products

1. **C. A. A. Franken et al. UNIVERSITY OF TWENTE – BIOPHOTONICS, METROLOGY and QUANTUM TECHNOLOGY**
   "Hybrid-integrated diode laser in the visible spectral range"
   doi: 10.1364/OL.433636

2. **Shihan Hong et al. ZHEJIANG UNIVERSITY – DATA CENTER and ON-CHIP PROGRAMMABLE SYSTEMS**
   "Ultralow-loss compact silicon photonic waveguide spirals and delay lines"
   doi: 10.1364/PRJ.437726

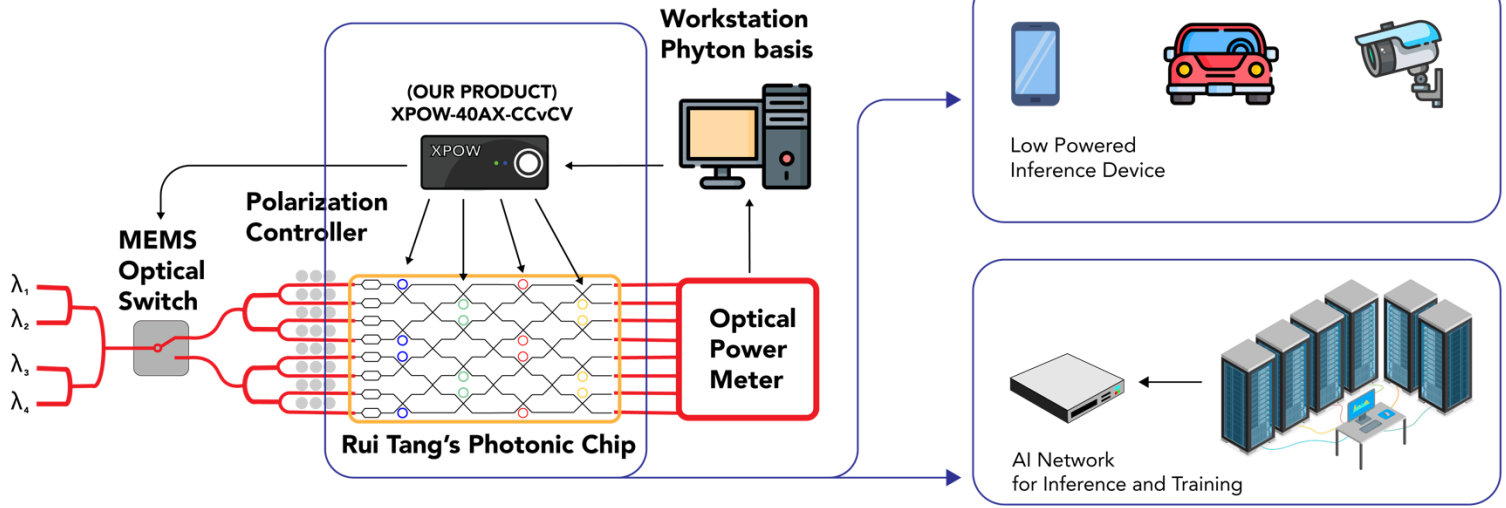
3. **Nemanja Jovanovic et al. CALTECH / JPL NASA – SPECTROGRAPH for EXOPLANET EXPLORATION**
   "An all-photonic, dynamic device for flattening the spectrum of a laser frequency comb for precise calibration of radial velocity"
   doi: 10.1117/12.2630301

4. **Nemanja Jovanovic et al. CALTECH / JPL NASA - SPECTROGRAPH for EXOPLANET EXPLORATION**
   "Flattening laser frequency comb spectra with a high dynamic range, broadband spectral shaper on-a-chip"
   doi: 10.1364/OE.470143

5. **M. R. N. Afif et al. NICSLAB OPS, INC.- LARGE-SCALE PIC PROGRAMMABLE SYSTEMS**
   "Simultaneous 1080-Channel Control and Measurement for Photonic IC"
   doi: 10.1364/OFC.2023.M3Z.16

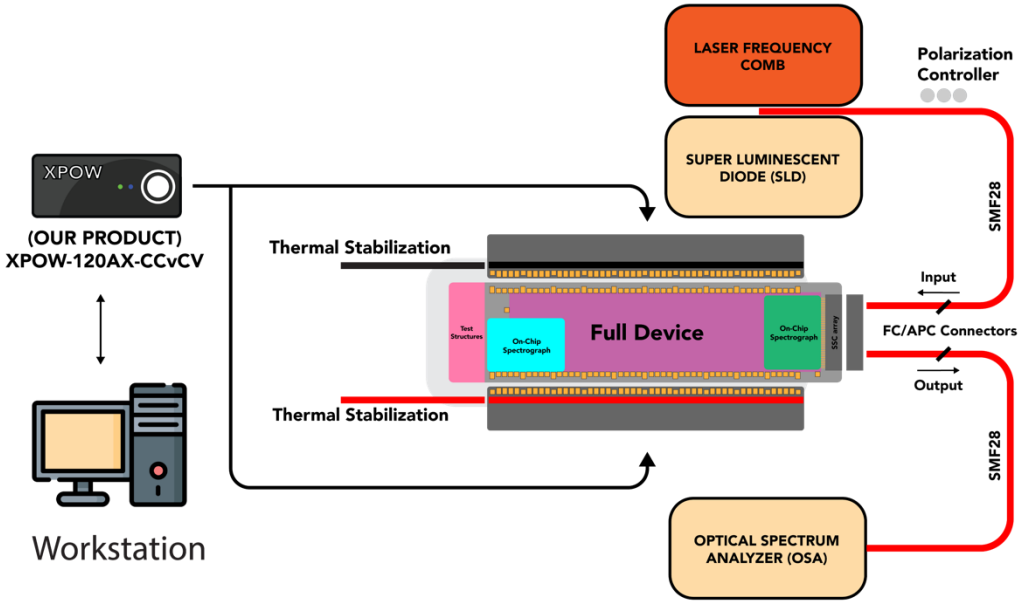
Customer use case 1:

Deep Learning Accelerator



AIST & University of Tokyo

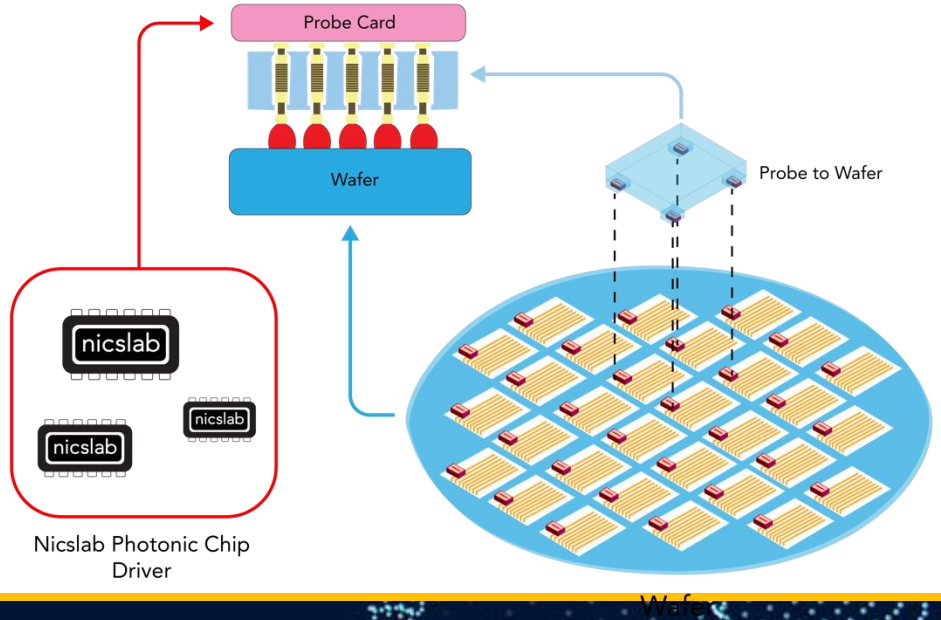
Customer use case 2: Spectrograph for Exoplanet Exploration



NASA JPL, Caltech, & CNRS France.

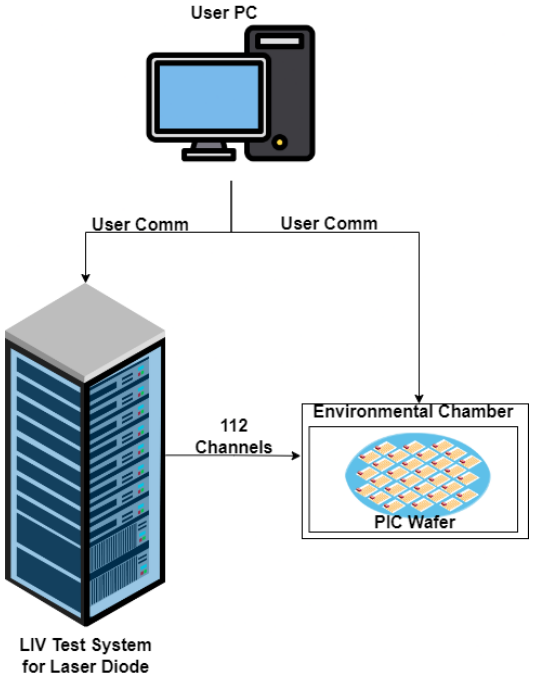
Customer use case 3:

Photonic Wafer Testing



Semiconductor foundries

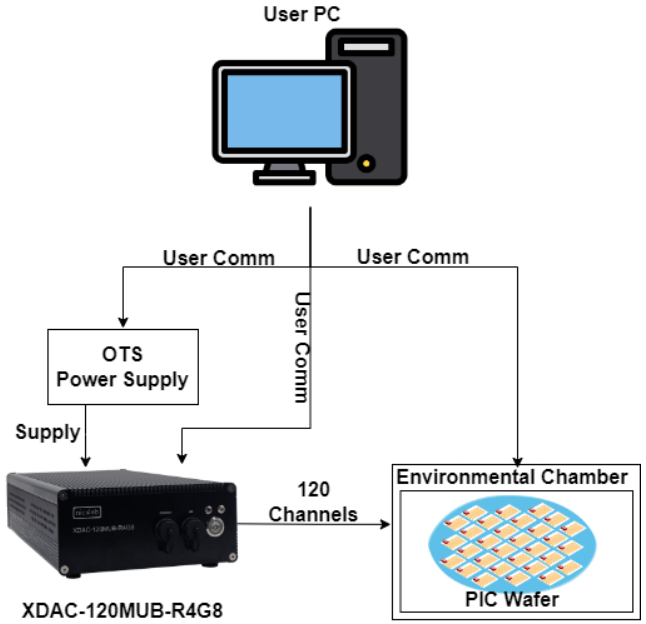
Industry today (Without Nicslab)



Purpose: Semiconductor testing

- **Photodiode/laser test**
- **Reliability test**
- **Yield production test**

Industry today (With Nicslab)



- **20X smaller**
- **3X cheaper**
- **Easier to use**
- **Software interoperability**
- **Scalable to 1000+ output**

Challenges and Solutions

- **Key Challenges**:
  - **Investment**: Securing sufficient capital to scale operations
  - **Talent**: Attracting and retaining top talent in a competitive market
  - **Innovation**: Keeping pace with rapid technological advancements
  - **Market Entry**: Navigating complex regulatory environments
- **Proposed Solutions**:
  - **Government Support**: Grants, tax incentives, and subsidies R&D & Infrastructure
  - **Partnership**: Collaborations with industry leaders, academia, and government
  - **Talent Development**: Government-sponsored training program & scholarship
  - **Regulatory Assistance**: Streamlining approvals and facilitating market entry

Call to Action:

- **Why Government & Private Investors Support is Crucial**:
  - Accelerating innovation and technological leadership
  - Ensuring national security and supply chain resilience
  - Creating high-value jobs and boosting the economy
- **Specific Requests**:
  - Direct investment and financial incentives
  - Support for R&D initiatives and talent development program
  - Collaboration on regulatory and market entry strategies

Conclusion

Summary:

Nicslab's vision is to become a global player in the next 5 years, requiring support in R&D, infrastructure investment, and HR development to overcome all challenges.

Closing Statement:

Government support and partnerships play an importance role in realizing our vision.

THANK YOU

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