INFRACHIP
European Research Infrastructure on Semiconductor Chips

Centre for Advanced Materials and Technologies CEZAMAT
Warsaw University of Technology

Research Accelerator Programme

"Photonic Integrated Circuits: design, technology and characterization"

Where: CEZAMAT, Warsaw University of Technology, Warsaw, Poland

When: 26-28 May 2025

Deadline to apply: February 15th, 10:00 AM CET

Summary

This RAP covers a theoretical overview and practical aspects of fabrication and characterization techniques used in Photonic Integrated Circuits (PICs). It will provide lectures and hands-on experience for various aspects of semiconductor technologies utilized in PICs development flow.

We invite you to explore the world of Photonic Integrated Circuits (PICs). CEZAMAT at Warsaw University of Technology invites you to an intensive **3-day workshop** designed for **students and PhD candidates** seeking to expand their expertise in one of today's most rapidly evolving fields. This workshop offers a unique combination of **theoretical insight** and **hands-on laboratory experience**, providing a robust foundation in the **design**, **fabrication** and **characterization** of PICs.

Throughout the workshop, you will:

- Delve into the fundamentals of **PIC design** and **semiconductor technologies**
- Explore **silicon-nitride**, **SOI**, and **Ge-on-Si** platforms used in advanced research and development
- Gain practical skills in state-of-the-art **fabrication** and **characterization** methods
- Work directly with **advanced equipment** in CEZAMAT's cutting-edge facilities
- Discover new applications of PICs in **bio** and **environmental sensing** systems

Costs for travel, accommodation and access to infrastructure are covered by INFRACHIP project for up to 6 applicants.

Why Integrated Photonics?

Integrated photonics is rapidly reshaping industries—from data centers and telecommunications to healthcare and environmental monitoring. By integrating photonic components onto a single microchip, these systems can deliver unprecedented performance in speed, energy efficiency, and miniaturization. As this emerging technology continues to expand its reach, expertise in integrated photonics will be indispensable for driving innovation in next-generation devices and applications.

Programme

This three-day RAP (Research and Academic Program) offers a comprehensive introduction to the full development flow of Photonic Integrated Circuits (PICs). From schematic-driven design to hands-on fabrication and characterization, you'll gain practical experience with the state-of-the-art tools available on-site at CEZAMAT WUT.

Day 1: Cleanroom Tour & Semiconductor Fabrication Essentials

Morning

- **Cleanroom Tour**: Experience our pilot-line facilities first-hand and see the advanced semiconductor processing equipment in action.

Afternoon

- **Introductory Presentation on Semiconductor Fabrication**
  - **Semiconductor Technology Basics**: Overview of processes and cleanroom protocols
  - **Deposition Techniques**: PCVD, PVD, LPCVD, and more
  - **Lithography Methods**: Photolithography and electron-beam lithography
  - **Etching Processes**: Wet and dry etching fundamentals
- **Introduction to Photonic Integrated Circuits**

Day 2: PIC Design & Fabrication

Morning

- **PIC Design Workshop**
  - Hands-on training using a **schematic-driven photonic CAD tool**
  - Introduction to best practices for PIC design

Afternoon

- **Hands-on Fabrication Session**
  - Practical exposure to semiconductor processes in a cleanroom environment
  - Opportunity to apply design concepts in real-world scenarios

For a complete list of equipment in our cleanroom, visit:
CEZAMAT Equipment

Day 3: Characterization Techniques

- **Automated & Manual Measurements**
  - Learn best practices for device characterization
  - Explore data analysis methods and interpretation of results

Why Attend?

- Comprehensive Experience: Cover every step of the PIC development workflow, from design through fabrication and testing.

- Hands-On Learning: Work directly with cutting-edge tools and equipment in a real pilot-line environment.
- Expert Guidance: Receive personalized instruction from researchers in integrated photonics.

Join us to deepen your understanding of PICs, refine your skills, and connect with like-minded professionals in this innovative field!

Don't miss this opportunity to gain **in-depth knowledge**, **practical experience**, and a glimpse into the **future of photonics**. Sign up now to enhance your skill set and stand at the forefront of this transformative technology!

Preliminary schedule

Time and date	Place	Topic
Day#1 9:00-12:15	Seminar room and labs	Welcome & lab tour
Day#1 13:30-16:30	Seminar room	Introduction to semiconductor fabrication techniques and PICs
Day#2 9:00-12:15	Seminar room & Design Lab	Introduction to Photonic Integrated Circuits: Design and Technology Aspects
Day#2 13:30-16:30	Labs	Hands-on experience in fabrication aspects
Day#3 9:00-12:00	Seminar room	Characterization of PICs

To apply, please fill the form on the dedicated RAP website page: https://infrachip.eu/research-accelerator-programme
In case of troubles, please contact us – contact@infrachip.fr