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1. Promoting International Cooperation at the ICOS Final Event

We were delighted to see ICOS partners and semiconductor stakeholders gathered for this final ICOS Workshop. The day was marked by a series of high-quality presentations showcasing the results achieved over the three years of the ICOS project, highlighting its scientific, technological, and strategic impact.

Beyond ICOS partners, we were honored to welcome distinguished guests who shared their insights during panel sessions, bringing valuable external perspectives and enriching discussions around the project's outcomes and future directions.

We are particularly pleased to highlight the very close cooperation we have developed with the European Commission throughout the three years of ICOS, especially thanks to the support of Werner Steinhoegl, Jonas Jütting, and Pierre Chastanet.

“ Together, we have worked to develop balanced semiconductor partnerships that accelerate technological innovation [...] contributing to Europe's economic strength and societal resilience. “



Pierre Chastanet, European Commission – DG Connect © SINANO Institute

This collaboration has been instrumental in strengthening international cooperation with leading semiconductor countries by aligning political, scientific, and technological strategies. We would like to warmly thank all ICOS partners for their presence and contributions at this event. Together, we have worked to develop balanced semiconductor partnerships that accelerate technological innovation and reinforce the semiconductor value chain, contributing to Europe's economic strength and societal resilience.



Panel Session © SINANO Institute



As a result of this workshop “Results & Recommendations on International Cooperation on Semiconductors for European Economic Resilience”, International Cooperation was highlighted as a key to speed up technological innovation, reducing cost by avoiding duplicated research, strengthening complex semiconductor value chains, knowledge exchange, manage risks due to the turbulent geopolitical context, overcoming gaps in standardisation and skills shortage.

All the presentation material and the reports containing detailed results can be found on the [ICOS website](https://www.icos-semiconductors.eu).

As Pierre Chastanet highlighted during his Welcome Address, ICOS results are not meant to stay on paper, their goal is to be used to help build the future of semiconductors.

These results provide actionable guidance for policymakers, researchers, and industry leaders, supporting the EU Chips Act and reinforcing Europe’s technological sovereignty and economic resilience.



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2. Two new reports releasing recommendations for the future of semiconductors

The ICOS project has released two thematic reports on Advanced Functionality and Computation, which serve as valuable assets for advancing the European Union's strategic position within the competitive and diverse semiconductors industry. Besides analysing the key drivers and opportunities for emerging technologies in advanced computation systems and More than Moore semiconductor innovations, these reports are pointing areas where international collaboration is needed to address the gaps and challenges the industry is facing.

The Report "Future Technologies for Advanced Functionality" led by Fraunhofer IISB identifies critical areas for the development of smart systems enabling ubiquitous intelligence – from the smart wearables and smart appliances to the electrified autonomous vehicles, industry 5.0, smart grids and digital healthtech.

Key topics include sensor design, the need for environmentally friendly materials in energy harvesting and the significance of III-V semiconductors in photonics to underline the benefits of cooperation. This report serves as an essential resource by summarising the key Advanced Functionality topics in which the European Union can actively participate, such as highly sensitive and more versatile sensors, energy harvesting and power electronics, or heterogeneous integration and packaging, leveraging these areas to create new opportunities internationally.

The Report "Future Technologies for Advanced Computation" led by CEA-Leti, examines the challenges faced by the future of computing, especially the growing demand for tailored solutions in terms of architectures. These new solutions must consider sustainable manufacturing, besides performance, power consumption, area and cost. In addition to meeting these criteria, there is also a pressing need to design novel computing architecture to support the diverse requirements of emerging applications such as artificial intelligence, machine learning or augmented and virtual reality. This report helps identifying the key factors expected to drive continued growth addressing the heterogeneous needs despite the slowing pace of CMOS scaling since 2008. This analysis presents the opportunities available for the European Union and the identified leading countries to strengthen research and development in advanced computing technologies.

The two deliverables dug into sources from existing international roadmaps, insights from previous studies, knowledge from the consortium and partner network, desk research and brainstorming sessions. The reports are public and available on the ICOS website. Aligned with the objectives of the EU Chips Act, several strategic actions require leverage from international cooperation as a key driver for the future of semiconductor technologies.

Read the full reports here:

- Future Technologies for Advanced Functionality
- Future Technologies for Advanced Computation



3. ICOS at the 26th International Conference on Industrial Technology Innovation in Taiwan

AENEAS Technical Director, Patrick COGEZ, was invited to present the European microelectronics funding landscape and the role of industrial associations in its governance at the 26th International Conference on Industrial Technology Innovation, which took place in Taipei on October 16th and 17th. This gave him also the opportunity for side meetings with the Taiwan Semiconductor Research Institute (TSRI) and the Industrial Technology Research Institute (ITRI). The side meeting with TSRI was actually initiated thanks to previous contacts established during the ICOS workshop in Warsaw earlier this year.

During these meetings, Patrick COGEZ had the opportunity to present the ICOS project, and most notably the report D3.3, Recommendations for International Research Cooperation, which lists the topics which were identified by the ICOS experts as most promising for R&I collaboration between Europe and other regions of the world. He invited the Taiwanese experts to have a look at this topic list and indicate the ones of most interest for them.

“*This visit allowed us to get a better understanding of Taiwan’s Science, Technology and Innovation (STI) System as well as gathering information on new initiatives.*”



Patrick Cogez, AENEAS during his visit in Taiwan

Without waiting for this formal feedback, Dr. COGEZ already identified several topics which have been mentioned as strategic directions for future technology development by the Taiwanese speakers during those days:

- Chiplet-based stacking technology and heterogeneous integration,
- Advanced packaging,
- New materials to reduce the dependence on rare earth materials,
- Enabling technologies to empower Artificial Intelligence at the edge.

On top of providing inputs for the definition of the topics for future EU-Taiwan R&I cooperation, the visit allowed to get a better understanding of Taiwan’s Science, Technology and Innovation (STI) System, as well as gathering information on new initiatives such as the Southern Taiwan Silicon Valley Program, which will prove very useful to enrich the final deliverables of the ICOS project.

4. Update on future technologies for advanced computation and functionality

In the frame of ICOS, Nadine Collaert, Fellow at imec, coordinated a new report on Technology Scanning and Foresight, an update of a previous deliverable on Advanced functionalities and Advanced Computing. Building on the ICOS consortium expertise, this report synthesizes recent roadmaps and expert inputs to reassess technological maturity, strategic relevance, and Europe's positioning.

In 2024, you coordinated a report on future technologies for advanced computation and functionality. Why was it important to provide an update one year later?

Because the technology landscape moved significantly within a year. AI workloads, heterogeneous integration, packaging, photonics, power electronics, and quantum technologies all evolved very fast, and new roadmaps emerged. At the same time, Europe's strategic gaps and opportunities shifted. Updating the report in 2025 ensured that our recommendations remained relevant, evidence-based, and aligned with the most recent technological and geopolitical developments. isolated device scaling.

On future technologies for advanced computation, what new trends did you identify?

We saw a clear shift: AI is now driving the entire roadmap. The main bottlenecks have moved from compute to memory bandwidth, data movement, and thermal constraints, so future architectures are becoming much more memory-centric.

We also observed a strong acceleration in heterogeneous integration and chiplet-based design, especially with hybrid bonding becoming mainstream. At the device level, new concepts like CFETs and backside power delivery are emerging to support higher-density logic. And finally, fabrics such as optical interconnects and CXL-based links are gaining importance as data movement becomes the dominant limiter. Overall, the trend is toward full system-level co-optimization rather than isolated device scaling.

Read the full interview of Nadine Collaert on the [ICOS website](https://www.icos-semiconductors.eu)



5. Workshop on Key Results of ICOS for European Economic Resilience at EF ECS 2025

ICOS organized a workshop as a side event of EF ECS 2025 in Malta on December 4th. The session presented exclusive results and outcomes of the ICOS project and focused on key recommendations. The workshop included an assessment of strengths and weaknesses across the semiconductor value chains within EU and in leading semiconductor countries, including strategic dependencies, market growth, and cooperation opportunities based on the development of partnerships. It identified the priority research topics for international cooperation, based on emerging technologies and critical needs related to technologies for advanced computation and advanced functionalities. During the workshop, a focus was done on partnerships and on building cooperative frameworks on initiatives of mutual interest.



Presentations are available on our Website:
[EF ECS 2025 Workshop: Key results of international cooperation on semiconductors for European economic resilience](#)



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6. A Last Word from the ICOS Coordinator

As the semiconductor world is undergoing rapid changes, the European project ICOS - International Cooperation On Semiconductors has successfully concluded its three-year mission: identify the needs and opportunities for international collaboration to strengthen the European semiconductor ecosystem, in alignment with the EU Chips Act and Digital Agenda.

International cooperation is key for speeding up technological innovation, reducing cost by avoiding duplicated research, strengthening complex semiconductor value chains, knowledge exchange, manage risks due to the turbulent geopolitical context, overcoming gaps in standardisation and skill shortage, and is encouraged by the new strategies of leading semiconductor countries.

The overall objectives of ICOS, which were successfully completed, were

- i) to implement, strengthen and develop the Digital Partnerships and Trade and Technology Councils in close cooperation with the European Commission,
- ii) to build balanced semiconductor partnerships with like-minded countries,
- iii) to set out cooperative framework on initiatives of mutual interest,
- iv) to identify and support the establishment of the most promising scientific international collaborations to overcome the main challenges in the European and International Roadmaps, in particular for Advanced Computing and Functionalities

- v) to organize matchmaking bilateral and multilateral events,
- vi) to support the growth of the Semiconductor industry in growing markets,
- vii) to strengthen Europe's position in emerging technologies and global value chains in this area, and to contribute to the EU Chips Act, Digital Agenda and Green Deal.

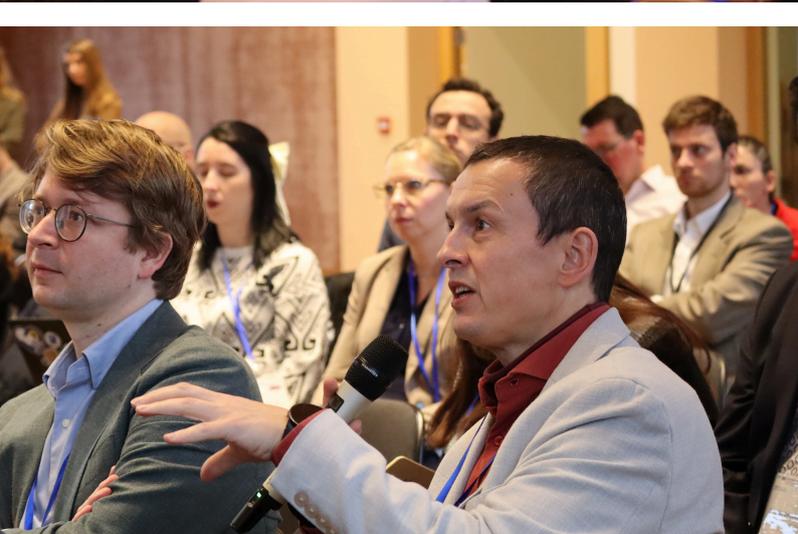
ICOS, in close collaboration with the European Commission, has strengthened International Cooperation with the main leading countries in the semiconductor field, by combining political, scientific, and technological strategies.

We would like to thank all of ICOS's industrial and academic partners for their great contribution to the project, as well as our international partners with whom we have organized numerous successful workshops. ICOS allowed to develop a global strategy for accelerating technological innovation and strengthening the semiconductor value chain, thereby contributing to Europe's economic and societal resilience.

-The new project devoted to international cooperation, ICOS-Squared, will be launched in the coming months and will further strengthen Europe's position in the global semiconductor ecosystem.

Francis Balestra,
ICOS Coordinator,
**Grenoble INP / CNRS/
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