

## [Press release] ICOS final recommendations to strengthen the European position in the global semiconductor value chain

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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 in this changing ecosystem](#).

Operating in alignment with the EU Chips Act, Green deal and Digital Agenda, ICOS has served as a bridge between the European Commission and international global like-minded countries. In the frame of the Digital Partnerships and Trade and Technology Councils, the project has contributed to develop promising balanced bilateral/multilateral semiconductor partnerships of mutual interest to strengthen Europe's position in emerging technologies and global value chains of semiconductors. In particular through the organisation of 24 bilateral/multilateral Workshops with key countries, including Japan, South-Korea, India, Singapore, USA and Taiwan. Very close and fruitful cooperation with the European Commission was established during the three years of ICOS to strengthen international cooperation with leading semiconductor countries by combining political, scientific and technological strategies.

### ICOS results to strengthen Europe position in the value chain of semiconductors

Building on a large consortium of experts, including Academia, industry, Associations and Consulting Companies, ICOS delivered many results destined to advise the European Commission policymakers and stakeholders on collaborative actions to be implemented with leading semiconductor countries, supported by an in-depth risk-benefit assessment. The ICOS results include:

- **Analysis of the semiconductor industrial ecosystems** in Europe and in 7 key non-EU countries (China, India, Japan, ROK, Singapore, Taiwan, US), alongside other studies on Canada and Malaysia.
- **Strategic Gap Analysis** underlying generic challenges and needs, but also next-generation and emerging technologies to identify opportunities for Europe based on international cooperation driven by public authorities
- **Collaborative Actions** with the organization of **24 bilateral and multilateral workshops and matchmaking activities** with European Industrial & Academic communities and leading semiconductor countries
- **Policy advices and recommendations** for international cooperation, including Research topic recommendations, potential cases of complementary cooperation between EU and other Countries, or recommendations for standardisation activities.

Overall, during its three years of operation, ICOS has implemented, strengthened and developed the partnerships with the leading semiconductor countries, in close cooperation with the European Commission.



## Technological Priorities for emerging technologies

The ICOS findings highlight that international cooperation is no longer a mere mechanism to fill short term technological gaps, but a strategic lever for transforming Europe's strong research base into industrial leadership and the foundation of new opportunities to strengthen Europe's position in global value chains in semiconductors, dominated by Asia and the United States.

Key recommendations for future collaborative research and investment include:

- **AI & Advanced Computation:** The AI-driven compute explosion requires a shift toward **heterogeneous architectures, optical interconnects, and advanced packaging** to maintain performance scaling and energy efficiency.
- Memory bandwidth and data movement bottlenecks are critical constraints; research into near-memory compute, processing-in-memory or alternative computing architectures should be accelerated.
- **Quantum technologies** remain highly exploratory, and Europe should maintain a diversified research portfolio across superconducting, silicon-based, and photonic qubits
- **Advanced Functionalities:** the domains which covers sensors, energy harvesting, power electronics, photonics, wireless communication... show strong innovation potential, with heterogeneous integration as a common enabler across these tracks.
- **Advanced packaging technologies** as strategic enablers: both for advanced computation and advanced functionalization. Europe must develop full-stack capabilities from devices to systems.

## A Call to Action for the European Ecosystem of semiconductors

Three-years of intense analyses, meetings and collaboration within the ICOS projects lead us to the conclusion that International Cooperation should be focused, mutually beneficial, and anchored in areas where complementary global strengths can help Europe overcome structural obstacles. Particularly in advanced packaging, high volume integration, memory technologies, and AI enabled design. At the same time, Europe must reinforce its internal capabilities through coordinated pilot line efforts, improved access to design and modelling infrastructure, and targeted skills development.

*"International cooperation is key to building balanced semiconductor partnerships with like-minded countries on initiatives of mutual interest. It is essential to strengthening Europe's position in global value chains and reinforcing the objectives of the EU Chips Act for European economic and societal resilience,"* says **Francis Balestra, coordinator of the ICOS project.**

Taking into account the actual geopolitical context and the semiconductor landscape, the role, objectives and results of ICOS are more strategic than ever for laying the foundations for future cooperation. 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.

**Read ICOS report** ["Policy Advice on International Cooperation on Semiconductors"](#)

## About the ICOS Partners



**AENEAS**, a not-for-profit industry association, aims to enhance the competitiveness of European industries in Electronic Components and Systems (ECS). It allows to influence RD&I policies, facilitates access to funding and offers networking opportunities. With over 580 members, it represents the full ECS value chain. Governed by a 20-member board from major companies, SMEs, and research centres, AENEAS advocates for the sector at the top European level. As a partner of the Chips Joint Undertaking, AENEAS represents the interest of its members in this tripartite partnership between industry, the European Commission and the participating states. AENEAS contributes to shaping and co-defining the Electronic Components and Systems Strategic Research and Innovation Agenda (ECS-SRIA), stimulates and supports collaborative innovation to meet societal and economic challenges in a sustainable way. AENEAS is also operating the EUREKA-funded programmes Xecs, and PENTA. More information about AENEAS:

<https://aeneas-office.org>



Semiconductors and sensors from **Bosch** ensure safe, comfortable, and low-emission driving. With power semiconductors based on silicon and innovative silicon carbide technology, application-specific integrated circuits, and MEMS sensors, Bosch offers OEMs and tier-1 suppliers a comprehensive semiconductor portfolio with sales locations in Europe, the U.S., China, Japan, Korea, India, and Taiwan. Bosch employs more than 6,000 associates in frontend manufacturing facilities in Germany and the U.S., as well as in backend and development sites around the world. Bosch has unique expertise both in the automotive systems business and in the production of semiconductors. By 2035, Bosch expects an average of more than 40 of its own chips to be integrated in every new vehicle. With more than 60 years of experience, a global manufacturing and partner network, as well as sustainable investments in production and development, Bosch is shaping the mobility of the future. <https://www.bosch-semiconductors.com/>



**CEA-Leti**, a technology research institute at CEA, is a global leader in miniaturization technologies enabling smart, energy-efficient and secure solutions for industry. Founded in 1967, CEA-Leti pioneers micro- & nanotechnologies, tailoring differentiating applicative solutions for global companies, SMEs and startups. CEA-Leti tackles critical challenges in healthcare, energy and digital migration. From sensors to data processing and computing solutions, CEA-Leti's multidisciplinary teams deliver solid expertise, leveraging world-class pre-industrialization facilities. With a staff of more than 2,000 talents, a portfolio of 3,200 patents, 14,000 sq. meters of cleanroom space and a clear IP policy, the institute is based in Grenoble (France) and has offices in San Francisco (United States), Brussels (Belgium), Tokyo (Japan), Seoul (South Korea) and Taipei (Taiwan). CEA-Leti has launched 80 startups and is a member of the Carnot Institutes network. Follow us on [www.leti-cea.com](http://www.leti-cea.com) and @CEA\_Leti.



Centre for Advanced Materials  
and Technologies CEZAMAT  
Warsaw University of Technology

**Centre for Advanced Materials and Technologies CEZAMAT** is a state-of-the-art research and innovation centre of the **Warsaw University of Technology**, dedicated to advanced materials, micro- and nanoelectronics, photonics, and semiconductor technologies. With nearly 20,000 m<sup>2</sup> of laboratories, including 4,000 m<sup>2</sup> of ISO-class cleanrooms, CEZAMAT provides comprehensive capabilities that enable advanced research, prototyping, technology validation and small- to medium-batch manufacturing. CEZAMAT actively collaborates with industry, research organisations, and European initiatives to accelerate technology transfer and industrial deployment. Its mission is to bridge fundamental research with high-impact applications, contributing to technological sovereignty, innovation capacity, and secure supply chains in Europe.



**DECISION Études & Conseil** is an independent European strategy consulting firm specialized since its establishment in 1991 in economic and industrial analysis and forecasts of the digital ecosystem, with a focus on electronic components and systems. Recognized for its expertise across the semiconductor value chain, DECISION integrates trade flows and geopolitical analysis into its assessments and relies on a strong international network of experts.

It supports the European Commission, Member States and private-sector clients — including industrial groups, SMEs and industry associations — in competitiveness and industrial policy studies, and leads market intelligence work packages under Horizon Europe, including ICOS,



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covering production, employment, company mapping and market forecasts by segment and country, thereby contributing to strengthening Europe's strategic position in semiconductors.



**Ghent University** is a top 100 university and one of the major Belgian universities counting over 41,000 students and 9,000 employees. Located in Flanders, Ghent University is an active partner in national and international educational, scientific and industrial cooperation. The Photonics Research Group (PRG) of Ghent University hosts ePIXfab, which performs the activities of Ghent University in the ICOS project. ePIXfab is an open non-profit alliance of academic and industrial organizations with a mission to promote silicon photonics science, technology, and applications in Europe and the world. ePIXfab acts as a catalyst for European academia and industry to strengthen the worldwide silicon photonics ecosystem. PRG is an affiliated lab of imec, consisting of 11 professors and over 70 research staff, focussing its research on silicon photonics.



For over a century, **Grenoble INP - UGA** has pursued its original mission: to train engineers. This core mission was soon joined by others, including scientific and technological research, doctoral training, continuing education, and support for industrial development. Grenoble INP - UGA has consistently supported - and often anticipated - industrial developments by establishing engineering schools and research laboratories. Grenoble INP - UGA continued its growth into the modern era by embarking on the journey of micro and nanotechnologies. In 2002, it became a founding member, alongside the CEA, of the Minatec innovation hub, inaugurated in June 2006. The Institute also plays a governance role in two key competitiveness clusters: Minalogic, a global leader in micro and nanotechnologies and embedded software, and [Tenerdis](#), which focuses on renewable energy.



The National Institute for Research and Development in Microtechnologies (**IMT-Bucharest**) is Romania's leading research institute dedicated to micro- and nanotechnologies. With over 25 years of experience, IMT combines advanced research, technological development and innovation in areas such as micro- and nanoelectronics, smart integrated systems, photonics, sensors and microsystems for environment and healthcare applications. The institute operates state-of-the-art cleanroom and laboratory facilities, supporting collaboration with academia, industry and European technology initiatives. IMT Bucharest coordinates the Romanian Chips Competence Centre (RO-SMARTSYS), strengthening national capacities in semiconductor design, manufacturing and integration, and contributing to the European Chips Act objectives. Through active participation in numerous European projects and networks, IMT fosters innovation and cross-border cooperation in the semiconductor and smart systems domains.



**Infineon Technologies AG** – driving decarbonization and digitalization; together. We are a world leader in semiconductor solutions, employing about 57,000 employees worldwide generating a revenue of about €14,7 billion in the 2025 fiscal year (ending September 30). Infineon is ranked number one provider of automotive semiconductors, discrete power devices, MEMS microphones, security ICs, and microcontrollers, enabling game-changing solutions for green and efficient energy, clean and safe mobility, as well as smart and secure IoT. Our semiconductor and systems solutions help to reduce carbon emissions and drive the digital transformation. We bring high levels of energy efficiency, safety, security, and convenience to countless industrial and consumer products and services. Every day. For an easier, safer, and greener life.



**Interuniversitair Micro-Electronica Centrum vzw ('IMEC')** is a globally recognized non-profit research and innovation hub specializing in nanoelectronics and digital technologies, founded in 1984 and headquartered in Leuven (Belgium). With a team of over 6,500 employees, including 350+ PhD students on site, IMEC drives innovation in advanced semiconductor and systems scaling, silicon photonics, artificial intelligence, beyond-5G communications, quantum technologies, and sensing. These advancements address critical challenges in health and life sciences, mobility, Industry 4.0, agro-food, smart cities, energy, education, sustainability, and more. Our state-of-the-art cleanroom infrastructure (300/200 mm, more than 14,000 m<sup>2</sup>), equipped for advanced lithography, next-generation logic, novel memory concepts, nano-interconnects, 3D integration, neuromorphic and quantum computing, among other technologies, is essential to our mission of translating fundamental research into industrial innovation.



**IUNET** is a non-profit research consortium that brings together the leading Engineering schools in Electrical Engineering and Computer Science from Italian universities. In European and national projects, IUNET serves as a unified interface for Italian universities, selectively involving research units with proven expertise in the project's specific themes. Additionally, it oversees both the scientific and administrative reporting of project activities. IUNET has a strong track record in JU-funded initiatives, with successful participation in ENIAC, ARTEMIS, ECSEL, KDT, and CHIPS-JU programs.



The **Fraunhofer Gesellschaft**, headquartered in Germany, is one of the world's leading organizations for applied research and participated in ICOS with two institutes: The Fraunhofer Institute for Integrated Systems and Device Technology (IISB) conducts applied research and development in the fields of micro- and nanoelectronics, power electronics, and mechatronics. The Fraunhofer Institute for Electronic Microsystems and Solid-State Technologies (EMFT) is regarded among the global leaders in microsystems technologies, explicitly in interconnect technologies for 3D integrated heterogeneous microelectronic systems. **EMFT** is partner in the European Pilot Line on Advanced Packaging and

Heterogeneous Integration for Electronic Components and Systems (APECS) and in Munich Quantum Valley (MQV). **IISB** is partner of the European Pilot Line on Wide Bandgap (WBG).



**NXP Semiconductors** N.V. (NASDAQ: NXPI) is the trusted partner for innovative solutions in the automotive, industrial & IoT, mobile, and communications infrastructure markets. NXP's "Brighter Together" approach combines leading-edge technology with pioneering people to develop system solutions that make the connected world better, safer, and more secure. The company has operations in more than 30 countries and posted revenue of \$12.27 billion in 2025.

Find out more at [www.nxp.com](http://www.nxp.com).



The **SINANO Institute** is the European Academic and Scientific Association for Nanoelectronics, acting as a network of excellence connecting the European Research and Academic community in semiconductor science and technologies. It gathers 27 academic/RTO members and 22 deep-tech start-ups in the area of fabrication, characterization, modelling, design and simulation of emerging nanoelectronic materials, devices, circuits and systems from 16 European Countries. The SiNANO mission is to secure the future of European semiconductor science and technology by mobilizing and nurturing the European R&I community, promoting and strengthening synergies in the field through our membership, accelerating the translation of excellent research into European knowhow, technologies, and products, ensuring the pipeline of talented researchers and the growth of skilful talent in an inclusive and diverse. SiNANO is the European representative of IRDS "International Roadmap for Devices and Systems". [www.sinano.eu](http://www.sinano.eu)



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Delft University of Technology (**TU Delft**) is the oldest and largest Dutch public technical university. With eight faculties and numerous research institutes, it has more than 27,000 students (undergraduate and postgraduate) and 6600 employees (teaching, research, support and management staff). Through the mission 'Impact for a better society' TU Delft creates collaborations with industry, governments and knowledge institutions. The Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS) focuses on developing novel, sometimes revolutionary, engineering solutions and technologies. Themes are broad, spanning health and well-being, the energy transition, the transition of our digital society, communication and sensing, IoT, artificial intelligence and unconventional computing/quantum technologies.



**Tyndall National Institute** is a leading European research and technology organisation and Ireland's global hub for semiconductor research and innovation. Its expertise spans the full technology stack - from advanced materials integration and device fabrication to integrated systems - ensuring that research excellence is translated into real-world impact through deep industry engagement, strong academic partnerships, and the commercialisation of



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sustainable technologies. Tyndall plays a central role in Ireland's engagement with the EU Chips Act through multiple strategic initiatives. It is a hosting partner in the EU CHIPS Pilot Lines NanoIC, FAMES, and PIXEUROPE, and coordinates I-C3, Ireland's Chips Competence Centre. Internationally recognised as a research leader in semiconductor, chip, and digital technologies, Tyndall applies its capabilities across key sectors including Information and Communications, Health and Life Sciences, Agritech and Food Security, Energy, and Climate Mitigation, as well as emerging areas such as quantum technologies and future computing.

## VDI|VDE|IT

With around 900 employees, **VDI/VDE Innovation + Technik GmbH** provides support and advice on the analysis of complex projects or market situations, comprehensive transformation processes, funding activities in research programmes from the German federal government, the German state governments and the EU, and the organisation of branch offices or contact offices for research and industry. As a project management agency, VDI/VDE-IT offers the right solution for every step in the innovation process. The company has seven locations in Germany: Berlin, Dresden, Munich, Bonn, Hanover, Erfurt and Stuttgart.



**VTT** is one of the leading European research organisation focused on carbon-neutral solutions, sustainable materials and digital technologies. We strengthen industry by combining technologies, generating knowledge and supporting commercialisation.

Our world-class micro- and nanoelectronics infrastructure enables innovation, design, prototyping and small-scale manufacturing. We support customers from early ideas to technology transfer.

VTT's micro- and nanoelectronics research infrastructure supports the entire research and development cycle of technologies such MEMS, optical MEMS, hyperspectral, integrated photonics, 2D materials, piezo materials as well as superconductive and semiconductor technologies. [www.vttresearch.com](http://www.vttresearch.com).