III-V Summit

Opening Remarks by Session Chair



C. Lee
Director General
EPIC Photonics, Berlin, Germany

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References

From Recognition to Industrial Leadership: Scaling Integrated Photonics in Europe



E. Brinkhoff
CEO
PhotonDelta, Eindhoven, The Netherlands

Abstract
Europe has built a world-leading position in integrated photonics, with strong capabilities across III-V technologies and complementary photonic integration platforms. The European Commission's proposed revision of the EU Chips Act marks an important milestone: Photonic Integrated Circuits (PICs) are explicitly recognised as a strategic semiconductor technology within Europe's future semiconductor strategy.

Recognition, however, is only the starting point. Europe's challenge is now to translate its technological leadership into industrial scale, market adoption and long-term global competitiveness.

This presentation will outline what is needed to make that transition: moving beyond research excellence towards industrialisation and commercial deployment; creating viable pathways to scalable manufacturing; expanding and upgrading existing European production capacity; and strengthening the complete value chain from materials and substrates to PIC manufacturing, electronic-photonic integration, advanced packaging, testing, components and systems.

The revised EU Chips Act provides an opportunity to turn decades of European research, investment and innovation into lasting industrial leadership. The next phase is not simply about making more photonic chips in Europe, but about building a globally competitive European industry around them.

Biography
Eelko Brinkhoff (CEO) is CEO of PhotonDelta, where he leads the mission to accelerate the growth and maturity of the integrated photonics industry in the Netherlands and Europe. With more than 25 years of experience in economic development, internationalisation and foreign direct investment, he brings a strong network across business, government, knowledge institutes and universities.

Before joining PhotonDelta in February 2024, Eelko was Managing Director Internationalisation at the Brabant Development Agency (BOM). He is committed to building a globally recognised photonic chip ecosystem that turns Dutch and European innovation into scalable applications in areas such as datacom, telecom, healthcare, quantum technology, robotics, sustainable agriculture and autonomous mobility.

References

Exploring the World of III-V Semiconductors: from materials to applications



F. M. Da Luz Soares
CTO
Ardora III-V, Vigo, Spain

Abstract
In this talk, we will present 3 different III-V semiconductor technologies (InP, GaAs, and GaN) from the point of view of a foundry. We will describe these 3 different material systems, along with some fabrication aspects, and the most attractive applications.

Biography
With more than 20 years of experience in the design and cleanroom fabrication of photonic components based on Indium Phosphide (InP) and other advanced photonic technologies, he has played a pioneering role in the development of photonic foundries and the industrialization of photonic integrated circuits. He holds a PhD in Photonic Integration and a Master's Degree in Electrical Engineering, combining deep technical expertise with extensive experience in bringing cutting-edge photonic technologies from research to manufacturing.

References

Enabling scalable III-V technology for RF and photonics applications at IMEC: Opportunities and challenges

A. Vais
Principal member of technical staff
Imec, Leuven, Belgium

Abstract

III-V semiconductor-based devices, in particular InP Heterojunction Bipolar Transistors (HBTs), are a strong contender for next generation high speed communication systems. In this presentation, motivation for the upscaling of III-V technology on to 200/300mm Si platforms is presented. A comparison of various options for such III-V on Si technology are described. The challenges in the way to achieve its integration into existing CMOS platform and possibilities to overcome them are shown. IMEC's path to enable a CMOS compatible III-V-on-300mm Si technology with the most recent results are demonstrated.

Biography

Abhitosh Vais received the Ph.D. degree in applied physics from the KULeuven, Belgium in 2016 for his work on III-V MOS devices and defect characterization. He was an Eramus-mundus scholar during 2010-2012, working on MSc in nanoscience and nanotechnology at KULeuven, Belgium and Chalmers Technology, Sweden. He joined IMEC, Belgium, in 2016, where he is a principal member of technical staff and leads the development of III-V on Si technology for advanced RF applications. Dr. Vais has authored or co-authored 60+ technical journal papers and conference publications and several patents.

References

Integration of III-V semiconductor devices with photonic integrated circuits for large-scale manufacturing of photonic modules



K. Obara
Project Lead
PHIX Photonics Assembly, Netherlands,
Netherlands Antilles

Abstract
Photonic integration and assembly are complex, multi-disciplinary processes that play a vital role in ensuring the correct functioning, reliability, and commercial viability of photonic integrated circuits (PICs). Semiconductor devices based on III-V materials play a key role in terms of emission, modulation, amplification, and detection of optical signals across multiple wavelength bands. During this talk, we will present different approaches for enabling co-integration between PICs fabricated in various material platforms and III-V semiconductor devices, allowing delivery of photonic modules compatible with large-scale manufacturing.

Biography
Karol Obara is a project leader at PHIX Photonics Assembly, the Netherlands, responsible for leading research and innovation projects in the field of photonics integration. Prior to joining PHIX in 2021, in the period from 2018 to 2021, he worked in the area of optical encoders at Renishaw, the United Kingdom. Karol holds a bachelor's degree (BScEng) and a master's degree (MScEng) from the Wrocław University of Science and Technology, Poland, in the field of Electronics and Telecommunication with specialization in Photonics.

References

Enabling Advances in AI Datacenter Infrastructure with Next Generation Wide Bandgap and Silicon Photonic Devices



M. Bourke
Mng Dir, Specialty Technologies and Strategic Marketing
Lam Research, Remote, United Kingdom

Abstract
AI-driven data center growth demands more efficient power delivery and higher-bandwidth interconnects. III-V semiconductors have a key role in meeting these needs. During this presentation we connect advances in gallium nitride (GaN) power devices with silicon photonics fabrication and integration, highlighting complementary approaches to improving system performance and energy efficiency.

Topics include scaling GaN-on-silicon manufacturing from 200mm to 300mm for efficient, high-power-density electronics, alongside demanding photonics processes for waveguides, optical coupling, and emerging modulator and photo detector materials. Advanced packaging and co-packaged optics extend the discussion to system-level electronic-photonic integration.

In this presentation, we draw on Lam Research's leadership in Specialty Technologies to examine how process innovation, scalable manufacturing, and integration can address next-generation data center power and connectivity challenges.

Biography
Michelle Bourke received her B.Sc. degree in Optoelectronics and Laser Engineering from Heriot-Watt University in Scotland, UK. Subsequently she joined the Defence Evaluation and Research Agency (DERA), where she worked on advanced processing methods for GaAs/AlGaAs optoelectronic devices. In 1997 she entered the semiconductor capital equipment industry as a technologist and has since accrued more than 25 years of experience in semiconductor technology, strategy, and new product development. She is a specialist in fabrication technologies for MEMS, Power Devices, RF Electronics and Optoelectronics.

Michelle is a frequent presenter at leading industry forums and also serves on many committees and industry councils. In November of 2018, she was inducted into the Semi MEMS and Sensors Industry Group Hall of Fame and in 2020 she was a Silicon Valley YWCA Tribute to Women Honoree. Michelle is currently Chair of the Semi MEMS Manufacturing Working Group, Co-chair of the Semi MEMs Standards Committee and a Director on the Transducers Research Foundation Board where she is the Chair of Fund Raising and Development Committee.

Michelle joined Lam Research in 2015 and is currently Managing Director of Specialty Technologies and Strategic Marketing in Lam's Corporate Strategy Group.

References

Enabling AI Datacenters with Advanced III-V Plasma Processing



R. Barnett
Director Etch Product Management
KLA, Wales, United Kingdom

Abstract
The rapid growth of artificial intelligence and high-performance computing is driving demand for faster, more energy-efficient datacenter connectivity. As datacenters transition toward high-speed optical links and co-packaged photonics, advanced III-V processing provides a critical foundation for lower-power, higher-bandwidth AI infrastructure
This presentation explores KLA's advanced plasma etch and deposition technologies for III-V compound semiconductors, including GaN, GaAs and InP devices used in VCSELs, lasers and optical interconnects. KLA's production-proven solutions support improved device performance, reliability and scalable manufacturing.

Biography
Richard Barnett
Director, Etch Product Marketing
Richard Barnett is Director, Etch Product Marketing at KLA, with more than 25 years' experience across the semiconductor industry. He joined Aviza Technology (later SPTS Technologies, now part of KLA) in 2007 as part of the etch product management team, and now leads this team which is responsible for all KLA's plasma etch products across Photonics, RF, Power, MEMS and Advanced Packaging end applications. He has led the Mosaic™ plasma dicing product line, writing and presenting many papers on this innovative approach to die singulation. Earlier roles covered fab process engineering, wafer supply and equipment process engineering. Richard holds a bachelor's degree in Materials Engineering and Electronics from the University of Nottingham.

References

Beyond Silicon Photonics: Next-Generation Multi-Material Integration through Photonic Heterogeneous Integration (PHI)



X. Luo
Head, Silicon Photonics, A*STAR Institute of Microelectronics, Singapore | Vice President, National Semiconductor Translation and Innovation Centre (NSTIC), Singapore
A*STAR Institute of Microelectronics, Singapore, Singapore

Abstract
As demand for higher bandwidth, faster data movement, and greater computing performance continues to grow, silicon photonics alone is becoming insufficient to meet the requirements of future AI, data-center, communication, and sensing systems. Photonic Heterogeneous Integration (PHI) addresses these challenges by combining the strengths of multiple material platforms, including III-V semiconductors for efficient light generation, silicon nitride (SiN) for ultra-low-loss routing, lithium niobate for high-speed modulation, and silicon for large-scale integration and manufacturing.
By leveraging the unique advantages of each material within a unified platform, PHI enables photonic integrated circuits that deliver higher performance, enhanced functionality, and improved scalability beyond what is achievable with silicon alone. This presentation will highlight recent breakthroughs in PHI technologies, key device demonstrations, and semiconductor-compatible manufacturing pathways that are accelerating the deployment of next-generation optical interconnects, AI infrastructure, and advanced sensing systems. The talk will also discuss how multi-material integration is shaping the future of photonic integrated circuits and enabling the transition toward 400 Gb/s-per-lane and beyond.

Biography
Dr. Luo received his Ph.D. in Electrical and Computer Engineering from The Hong Kong University of Science and Technology in 2010, specializing in silicon photonics. He began his career at A*STAR Institute of Microelectronics, focusing on silicon photonic integrated circuits (Si-PICs) and heterogeneous optoelectronic integration. In 2017, he co-founded Advanced Micro Foundry, leading the development of silicon photonics integration platforms and Process Design Kits (PDKs). He returned to IME in 2023 as Principal Scientist and, in 2024, was appointed Head of the Photonics & Sensors Department at IME and Vice President of Silicon Photonics Platform Technology at National Semiconductor Translation and Innovation Centre, where he leads next-generation silicon photonics heterogeneous integration.

Dr. Luo is a Fellow of Optica, Senior Member of IEEE, Lifetime Member of SPIE, and member of PMI. He serves on the editorial boards of leading photonics journals and has previously held editorial positions across both academic and industry-focused publications. He is also actively involved in the international photonics community through conference leadership, technical program committees, and peer-review activities. Dr. Luo has authored or co-authored more than 200 publications, contributed to 5 book chapters, and holds over 30 patents in photonics and optoelectronics.

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