
## III-V Summit – Integrated Photonics

### Opening Remarks

A. Manocha
President and CEO
SEMI, Milpitas, United States of America

**Abstract**
Coming Soon

**Biography**
Ajit Manocha is the president and CEO of SEMI. Headquartered in Milpitas, California, SEMI is the global industry association serving the electronics manufacturing and design supply chain. Throughout his career, Manocha has been a champion of industry collaboration as a critical means of advancing technology for societal and economic prosperity.
Manocha was formerly CEO at GLOBALFOUNDRIES. Prior to this he held the role of EVP of worldwide operations at Spansion and earlier served as EVP and chief manufacturing officer at Philips/NXP Semiconductors. He began his career at AT&T Bell Laboratories as a research scientist where he was granted more than a dozen patents related to semiconductor manufacturing processes that served as the foundation for modern microelectronics manufacturing. He has served on the boards of SEMI, SIA and GSA.
Today, there is a much broader scope for SEMI to help foster collaboration and fuel growth than we could have ever imagined at its inception in 1970. This scope has to be accomplished without compromising the strong foundation of SEMI – the equipment suppliers and materials makers. Manocha feels SEMI must evolve as the industry's ecosystem rapidly expands to support smarter, connected applications based on artificial intelligence, machine learning and other disruptive technologies.
Manocha is active on global advocacy and workforce development issues and has served on the President's committees for "Advanced Manufacturing Partnerships" and the President's Council of Advisors on Science & Technology (PCAST).
In 2021, VLSIresearch added Manocha to its Semiconductor Industry Hall of Fame for his leadership of SEMI efforts to address geopolitical trade tensions as well as for his initiative in navigating the many challenges of the COVID-19 pandemic impacting SEMI and the microelectronics industry. In 2020, Manocha was inducted into the Silicon Valley Engineering Hall of Fame, and VLSI named him an "All Star of the Semiconductor Industry" for his visionary leadership in 2019 to restructure SEMI to represent the expanded electronics supply chain.

References

## Welcome Remarks

L. Altimime
President
SEMI Europe, Berlin, Germany

**Abstract**
Coming Soon

**Biography**
Laith Altimime, as President of SEMI Europe, leads SEMI's activities in Europe and the Middle East and Africa (EMEA). Altimime has P&L responsibility as well as ownership of all Europe region programs and events, including SEMICON Europa. He is responsible for establishing industry standards, advocacy, community development, expositions, and programs. He provides support and services to SEMI members worldwide that have supply chain interests in Europe. He manages and nurtures relationships with SEMI members in the region and globally as well as with local associations and constituents in industry, government, and academia. Altimime has more than 30 years of international experience in the semiconductor industry. Prior to joining SEMI in 2015, He held senior leadership positions at NEC, KLA-Tencor, Infineon, Qimonda and imec. Altimime holds an MSc from Heriot-Watt University, Scotland.

References

# IBM Quantum System One

H. Riel
IBM Fellow
IBM Research, Science & Technology, Rüschlikon, Switzerland

**Abstract**
Coming Soon

**Biography**
Coming Soon

References

## Broader Sensing

P. Kat
CEO
Amazec Photonics B.V., Oudkarspel, Netherlands


**Abstract**
Coming Soon

**Biography**
Coming Soon

References

## Advancing Connectivity with III-V Materials

N. Collaert
Fellow and Program Director of the Advanced RF Program
imec, Leuven, Belgium


**Abstract**
The relentless pursuit of advanced connectivity solutions has positioned III-V materials at the forefront of wireless, wireline, and photonic technologies in general. Characterized by their exceptional electronic and optical properties, III-V compounds such as GaAs, InP, and GaN are pivotal in the evolution of next-generation communication systems. In wireless applications, III-V semiconductors enable superior performance in high-frequency and high-power scenarios essential for 5G and beyond. These materials underpin the development of efficient power amplifiers, low-noise amplifiers, and high-speed transistors, which are crucial for enhancing signal transmission and reception.

For wireline communication, particularly in fiber optics, III-V materials offer unmatched capabilities. InP-based photonic integrated circuits (PICs) facilitate high-speed data transmission and low-loss signal processing, addressing the ever-growing demand for bandwidth in data centers and long-haul networks.

In recent years, the silicon photonics industry has experienced significant growth, enabling the integration of various optical devices on large-scale Si wafers with mature CMOS process technology. The integration of III-V materials and devices, including lasers and amplifiers, is crucial to complement these silicon photonics platforms.

Therefore, heterogeneous integration techniques, such as flip-chip bonding, micro-transfer printing, wafer reconstruction and selective area growth, play an essential role in designing future photonic and electronic integrated circuits. These methods meet high device density and production cost requirements while leveraging the advantages of III-V technologies.

This presentation provides an overview of how III-V materials are revolutionizing connectivity across various domains. These materials are central to overcoming the limitations of traditional technologies and offer promising solutions for the future of the global communication infrastructure. We will focus particularly on efforts to integrate III-V materials with silicon-based technologies.

**Biography**
Dr. Nadine Collaert is a program director at imec. She's currently responsible for the advanced RF program looking at the heterogeneous integration of III-V/III-N devices with advanced CMOS to tackle the challenges of next-generation mobile communication. Previously, she was a program director of the logic beyond Si program, focused on researching novel CMOS devices and new-material-enabled devices and system approaches to increase functionality. She has been involved in the theory, design, and technology of FinFET devices, emerging memories, transducers for biomedical applications, and the integration and characterization of biocompatible materials. She has a Ph.D. in electrical engineering from the KU Leuven, (co-) authored more than 400 publications, and holds more than ten patents in device design and process technology.

References

# Tracking the Supply Chain for Compound Semiconductor Materials

L. Shon-Roy
President/Founder
TECHCET CA LLC, San Diego, United States of America


**Abstract**
Coming soon

**Biography**
Lita Shon-Roy ——has worked throughout the semiconductor supply chain, leading strategy, business development, marketing and sales for chip designers, equipment OEMs, and material suppliers for over 30 years.

Her experience spans from process development of memory chips to business development of gases & precursors and capital equipment. She developed new business opportunities for companies such as RASIRC/Matheson Gases, Air Products & Chemicals, and IPEC/Speedfam, and managed marketing and sales in companies such as Air Products/Schumacher, Brooktree/Rockwell, and Hughes Aircraft.

Ms. Shon-Roy is considered one of the leading experts in electronic materials market analysis and business development. She has authored and co-authored 100's of articles, reports and texts on semiconductor process materials markets, trends, and worldwide supply chain issues, and has been quoted in the Wall Street Journal and featured on BBC News. She holds an M.B.A. from California State University, Dominguez Hills, a M.S.E.E. from the University of Southern California, and a B.S. in Chemical Engineering from UC San Diego.

References

## High-Speed Modulators for Datacom, 6G and Computing Applications

O. Ozolins
Professor
Riga Technical University, Riga, Latvia

**Abstract**
The increasing demands of Artificial Intelligence (AI) applications are placing more stringent requirements on optical interconnects, particularly in terms of bandwidth and speed. To meet these challenges, large bandwidth modulators have become essential for enabling high-speed data transmission across a variety of applications. Multiple technologies, including Indium Phosphide (InP), Silicon Photonics (SiP), heterogeneously integrated InP on SiP, thin film lithium niobate, and plasmonics, offer promising solutions for the development of these high-speed modulators.
In this talk, I will provide an overview of our group's recent activities focused on the design and testing of large bandwidth modulators. We have achieved several world-record demonstrations in recent years, utilizing InP, SiP, and heterogeneously integrated InP on SiP waveguide modulators. These accomplishments highlight the cutting-edge advancements in modulator technology, positioning our work at the forefront of high-speed optical communication research.

**Biography**
Professor Oskars Ozoliņš defended his Ph.D. degree at Riga Technical University in 2013 and his habilitation degree at KTH Royal Institute of Technology in 2021. He is an Academician at the Latvian Academy of Science. He is coholder of 10 world records reported at conference post-deadline sessions: (1) on optical amplification free 200 Gbps OOK transmitted with single integrated externally modulated laser (EML) in InP at OFC2022, (2) on highest OOK and PAM symbol rate with InP EML at OFC2023, (3) on electroabsorption modulator that is heterogeneously integrated InP on silicon waveguide at OFC2024. Recent demonstration includes 224 Gbaud OOK generated with TFLN modulator that will be presented at ECOC2024. He is the author of around 250 international journal publications, conference contributions, invited talks/tutorials/keynote/lecture, patents, and book chapters (h index 27, citations 2730). Professor O. Ozoliņš is a Technical Program Committee (TPC) member of the ECOC and OFC.

References

# Integrated photonics in 6G

P. Annamaa
6G hardware technology lead
VTT, Espoo, Finland


**Abstract**
Presentation on potential applications and areas of technology development for integrated photonics for 6G

**Biography**
Petteri is 6G Hardware Technology Lead at VTT with a passion in turning research into business. He looks for exceptional opportunities and creates strategic commercial partnerships. Petteri has a background in research, product development, engineering and business development both from VTT as well as from the information technology hardware, cyber security and automotive industry. Petteri holds a degree in Lic Tech in Telecommunications Electrical Engineering from University of Oulu.

References

# Packaging of micro-optical components for light coupling in silicon photonics

S. Wakeel
Ph.D. Researcher
Tyndall National Institute, Photonic packaging and system integration, Cork, Ireland


**Abstract**

*This presentation will focus on the development of novel packaging processes using micro-optics to achieve high levels of optical connectivity to photonic devices. Furthermore, using micro-optics enables directly pluggable fibre connections, avoiding the need to bond optical fibre arrays to the facet of the photonic device. My presentation will review the theoretical requirements for micro-optical packaging for photonic devices and experimental packaging processes, which have the potential to scale to high volume. These novel packaging processes are particularly suited to data centre applications where the massive growth in bandwidth densities presents significant challenges for photonic device packaging.*

**Biography**

Saif Wakeel is a Ph.D. student in the Photonic Packaging and Integration Group at Tyndall National Institute, University College Cork. He received Master Degree from University of Malaya, Kuala Lumpur, Malaysia in 2022 and Bachelor Degree from Aligarh Muslim University, India, in 2018. Before joining Tyndall, He was with NXP Semiconductors, Malaysia, for two years. He was also a Research Intern at the National University of Singapore (NUS), Singapore. He has spent a year of research exchange at Dicle University, Turkey under Erasmus+ program. His research interests include wafer-level photonic and electronic packaging, novel micro-optics and integration methods, micro-transfer printing, and the reliability of photonic packaging. He has authored several publications, and two invited books with 400+ citations. He is a recipient of Wrixon Research Excellence Fellowship for attending Massachusetts Institute of Technology (MIT) as a visiting researcher.

References

# Ellipsometry in Photonics Industry: Advancing Integrated Photonic Devices

A. Bölcskei-Molnár
Product Manager
Semilab, Ellipsometry Department, Budapest, Hungary


**Abstract**
Ellipsometry is a valuable technique in silicon photonics industry, offering precise non-destructive measurements of film thickness, refractive index, and surface roughness which is critical for device fabrication. It enables precise characterization of multilayer structures, supporting process control and optimization during manufacturing. By ensuring uniformity and quality in optical components such as waveguides and modulators, ellipsometry is instrumental in advancing the performance and reliability of photonic devices.

**Biography**
Anna Bölcskei-Molnár is a materials scientist MS since 2016. She has 7 years of experience in the semiconductor industry, rooted in experimental physics and skilled in application development. She is the product manager and software product owner of Semilab's industrial automated ellipsometer product line since 2020. Anna has a strong track record of developing customized measurement methodologies to address specific application needs. She is working closely with cross-functional teams to oversee product development, define requirements, and ensure timely delivery while maintaining product quality.

**Biography**

References

# BLACK Semiconductor : a journey to connect chips.

C. Huyghebaert
CTO
Black Semiconductor GmbH, Aachen, Germany

**Abstract**
This presentation will adress the journey of Black Semiconductor and the pathway towards the development of a new enabling technology that targets to solve key industry data communication bottlenecks. Founded in 2020 by Dr. Daniel Schall and Sebastian Schall, Black Semiconductor is developing a new way to build networks of chips leveraging a novel material: graphene. These new chip networks will speed up data communication between chips for unparalleled performance, improved energy-efficiency, and reduced manufacturing cost. Black Semiconductor has the ambition to enable mass production of graphene semiconductors in full compliance with existing industry standards – a pioneering achievement for the industry. The company's technology and hardware facilitate optical chip-to-chip connections, allowing countless chips to interact almost as if they were one.

**Biography**
**Cedric Huyghebaert** is currently CTO at Black semiconductor a startup which wants to enforce a paradigm shift in chip to chip communication through graphene based photonics. Before that he acted as Program manager of exploratory processes and modules at imec, dealing with material exploration and early module integration for functional applications. He was the initiator and the technical lead of the 2D experimental Pilot line division in the Graphene Flagship, a project which has the ambition to enforce the adoption of 2D materials by the semiconductor industry. He started in 1999 as a junior researcher in the materials and component analyses group at imec. He studied the oxygen bean interactions during sputtering profiling of semiconductors. He received his PhD in Physics in 2006 at the KULeuven in Belgium. In 2005 he joined imecs pilot line as a support integration engineer, especially dealing with the process contamination control. He was part of the packaging group from end 2007 till begin 2010, working as a senior integration engineer dealing with 3D-stacked IC integration. From 2010 to 2019, he led the nano-applications and –material engineering (NAME) group at imec. He (co-)authored more than 200 peer reviewed journal and conference papers. He has a h-index of 42 and his work was cited >7000 times (google scholar).

References