Fab Management Forum

Welcome Remarks

L. Altimime
President
SEMI Europe, Berlin, Germany

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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

Driving Collaboration and Digitalization: The Role of Virtual Factories in Production Planning

J. Wittmann
Head of Innovation, Virtual Factory, Virtual Commissioning at BMW Group Production
BMW Group, Munich, Germany

Body

In a world shaped by globalization, sustainability, and digitalization, industries face the challenge of adapting to rapid changes and escalating consumer demands, leading to shorter development cycles and increasingly complex system landscapes. BMW has responded to these challenges by not only adapting but also redefining the future through the digitization of its vehicle factories as well as the virtualization of its factory planning.

BMW's digitization initiative has thoroughly documented all vehicle production facilities using 3D scanning technologies, creating a digital repository with panoramic images and point clouds. This repository, utilized by over 37,000 users, supports diverse use cases such as virtual factory tours, precise measurements, and data exports for external collaboration, enabling seamless global interaction.

Further, BMW has developed a platform for virtual and collaborative 3D production planning. This platform, integrating 3D data from various source systems, serves as a centralized visualization tool that constructs detailed virtual factories. It is set to become an indispensable tool for planners and viewers, promoting efficient, real-time collaborative planning and early virtual validation within the context of the entire virtual factory. Thereby it enhances the decision-making processes and minimizes the reliance on physical prototypes.

This shift from static digital archives often in 2D to dynamic, collaborative 3D planning environments highlights the transformative role of virtual factories on production planning and operational efficiency. Through these innovations, BMW is setting new benchmarks in manufacturing excellence and sustainability.

Biography

Jürgen Wittmann has held various functions in R&D, production, and finance at the BMW Group. Since 2021, he has been the Head of Innovation, Virtual Factory, Virtual Commissioning, and Digital Twin at BMW Group production. In this role, he oversees the innovation management as well as the development of the virtual factory within the production department.

References

Topic Coming Soon

S. Nicoleau
Group Vice-President Technology
ST Microelectronics, Crolles, France

Body
To be shared soon.

Biography
Since 2024, Serge Nicoleau is Group Vice-President Technology in charge of defining, implementing, and driving the R&D governance of Digital and BCD technologies of STMicroelectronics. He started his career in STMicroelectronics in 1998 in manufacturing management of the 200mm Crolles fab, nearby Grenoble. After various positions in manufacturing, process engineering, equipment engineering, he joined in 2004 the Crolles 300mm fab within the Crolles2 Alliance between STMicroelectronics, Motorola/Freescale and Philips/ NXP. In 2007, he became Director of Industrial Technologies, before enlarging his responsibilities in 2012 as Deputy Director of the Operations of both Crolles 200 and 300 fabs.
This role included a specific responsibility for the industrial challenges of Automotive and IoT products in technologies ranging from 0.5µm down to 28nm critical dimensions with their multiple variants and options.
In 2018, Serge Nicoleau is engaged into the new STMicroelectronics 300mm fab program in Agrate (Italy) to support Smart Power, Analog Mixed Signal and eNVM products. Then in 2020, he took the responsibility of the Technology & Design Platforms organization as General Manager. This organization is covering digital technologies, fast analog technologies, embedded memories, and optical sensors, with teams in France, in India, in United States which are addressing the digital products of STMicroelectronics.
Serge Nicoleau holds an Engineering Degree of the Ecole Polytechnique (Paris), a master’s degree in Theoretical Physics of the Ecole Normale Supérieure (Lyon) and a PhD in Particle Physics.

References

Data, Standards, People – Enabler of a Smart 300 mm Fab

S. Fischbach
Group lead data analytics and machine learning
Robert Bosch Semiconductor Manufacturing
Dresden GmbH, Dresden, Germany

Body

To ensure a high-quality and cost-effective manufacturing in a modern semiconductor fabrication it is crucial to install high levels of automation and to leverage big data and AI. The integration of such technologies into a production system, however, can only be successful with a data-centric architecture, strict data governance and standards, and a data-driven mindset of the people shaping those systems. The presentation will illustrate how these enablers were installed and are permanently fostered at the new Bosch 300mm wafer fab in Dresden. Some highlights from the analytics and AI use cases will showcase the effectiveness of those factors.

Biography

Sarah Fischbach is a group lead for Analytics and Machine Learning at Robert Bosch Semiconductor Manufacturing Dresden GmbH. She joined Bosch in 2018 working on strategies for advanced analytics solutions for the new 300mm semiconductor plant. Before that she has been a research associate working on Semiconductor Physics at Technical University of Berlin completing a PhD in 2019. She holds a master's degree in Physics from Technical University of Berlin and a bachelor's degree in Physics as well as a diploma in Technical Economics from Karlsruhe Institute of Technology.

References

Topic Coming Soon

J. Behnke
General manager for Smart manufacturing
INFICON, Cologne, Germany

Body
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Biography
Mr. Behnke has 40 years of semiconductor industry experience including: logic and memory manufacturing, technology/product development and fab operational excellence. As the GM of Final Phase Systems an INFICON Product Line, John leads a team that develop and deploy SMART software solutions that enable fabs to improve their manufacturing efficiency. FPS's suite of software solutions are built upon a common Datawarehouse which enables advanced Fab Scheduling and optimized WIP movement as well as other related capabilities. He is also a Co-Chair of the Semi North America Smart Manufacturing Special Interest Group.

Prior to FPS John served as the CEO and President of Novati Technologies, the SVP and GM of the Semiconductor Group of Intermolecular, the CVP for Front End Manufacturing, Process R&D and Technology Transfers at Spansion and the Director of AMD's Fab 25's Engineering and Operations groups where he was a founding member of AMD's Automated Precision Manufacturing (APM) initiative which led the Semiconductor industry's development and use of APC and other advanced factory systems. He also led the successful conversion of Fab 25 from Logic to Flash memory which was enabled through the virtual automation of the fab.

Mr. Behnke earned a B.S. degree in Mechanical Engineering with an Industrial Engineering Minor from Marquette University. Mr. Behnke holds five U.S. patents.

References

Topic Coming Soon

M. Lösel
Product Specialist
Tokyo Electron Europe, TFF, Dresden, Germany

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Biography
Maximilian has more than 10 years of experience in the semiconductor industry. After his apprenticeship as mechatronics technician at Infineon Dresden he went to engineering school for mechatronics (state-certified engineer). After that, Maximilian joined Tokyo Electron in 2019 as Field Service Engineer for Thermal Processing Systems and started to study Industrial Engineering, where he a achieved a bachelors degree in 2021. Since 2022, Maximilian is part of the European Furnace Technical Support Team. Since that, he has been involved in different technical projects, such as tool evaluations and various optimizations, working closely with customers. In 2023, Maximilian achieved a master's degree in parallel to his job in Industrial Engineering from Hochschule Wismar. Since 2024, he is a doctoral candidate at Fraunhofer IPMS / Technische Universität Dresden, working on sustainable solutions for high temperature processes.

References

Topic Coming Soon

J. Potter
CEO & Cofounder
Flexciton, London, United Kingdom

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Biography
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References

New Metrology and Inspection Era : 1+1=3?

A.-L. Charley
R&D manager
imec, Leuven, Belgium

Body

New system architecture as well as continuous scaling are important pillars of advanced semiconductor research and development, and both bring new challenges to today's metrology and inspection techniques. In parallel, improved process control comes with tighter specifications and therefore reduced metrology budget. Conventional metrology approaches cannot alone cope with this ever increasing demand for performance and a new approach has to be considered. This presentation will explore the importance of metrology solutions and what a realistic implementation could be to ensure the success of advanced semiconductor R&D efforts.

Biography

Anne-Laure Charley owns a PhD in physics of semiconductor from INPG (Institut national polytechnique de Grenoble, France) specialized in lithography and optic for semiconductor (graduated in 2006). She started her career as lithography R&D engineer at STMicroelectronics (France) and at Crocus Technology (San Jose, USA). She joined imec in 2008 as researcher in metrology for advanced patterning applications. She became R&D team leader in the field of CD metrology in 2015 and is now managing the inline metrology and inspection group in the advanced patterning department.

References

Supporting Fab Operations Using Multi-Agent Reinforcement Learning

J. van Heugten
CTO
minds.ai, Santa Cruz, United States of America

Body

As semiconductor operations grow increasingly complex, optimizing production schedules has become too challenging for advanced algorithms and skilled manufacturing engineers (MEs). We present how real-time machine learning, specifically reinforcement learning (RL), can enhance decision-making in semiconductor fabrication facilities.

Modern 300MM semiconductor fabrication facilities face challenges such as complex hierarchical structures, high financial stakes, and dynamic processes. These facilities contain thousands of tools with unique capabilities, resulting in intricate dispatching schedules. Frequent schedule updates are required due to maintenance, failures, and shifting priorities. This constant updating makes it impractical for MEs to manually optimize scheduling parameters.

To address these issues, we present an RL-based solution to support MEs in scheduling decisions. RL uses simulations and historical data to generate optimized scheduling strategies tailored to current FAB conditions. Automating routine tasks allows engineers to focus on exceptional occurrences and enhance productivity. The system offers real-time schedule modifications to improve key performance indicators (KPIs) like throughput, tool idle time, and critical queue time constraint violations. Machine learning integration not only improves these KPIs but also enhances engineers' quality of life by reducing time constraints.

The deployed solution has shown significant improvements in wafer production and operational efficiency with virtually no downsides. The implementation is built using the minds.ai Maestro framework and robust and automated Machine Learning Operations (MLOps) processes.

Combining advanced machine learning techniques with the expertise of MEs has increased wafer production and improved engineers' quality of life. This approach demonstrates AI's transformative potential in complex manufacturing environments.

Biography

Jasper van Heugten is the Chief Technology Officer at minds.ai. He leads the research and development of the minds.ai Maestro product, an optimization suite for Semiconductor Manufacturing leveraging state-of-the-art Deep Learning (AI) methods, including Deep Reinforcement Learning. He has 9 years of experience in scaling AI from early idea to production at Fortune 100 companies across multiple industries, such as Semiconductor, Pharma, Automotive, Renewables, and Big Tech. He holds a PhD in Theoretical Physics from Utrecht University, the Netherlands.

References

Green Building Standard LEED – Sustainability in Semiconductor Fab Design and Construction

F. Lindner
Quality Manager
Infineon Technologies Dresden GmbH & Co. KG,
Dresden, Germany

Body

The growing scarcity of natural resources is one of today's greatest global challenges. Optimizing the efficiency in the use of resources offers both ecological and economic benefits and is a key component in Infineon's sustainability strategy worldwide. Hence, they are high priorities in the planning and construction of the Smart Power Fab in Dresden. This includes being the first Infineon fab to strive for "Leadership in Energy and Environmental Design" (LEED) – a sustainability certification used worldwide defining standards for environmentally friendly, resource-conserving and sustainable construction. LEED provides a framework for healthy, highly efficient, and cost-saving green buildings. With a LEED certification we demonstrate our commitment to both client satisfaction and promoting a more sustainable future by reducing our reliance on limited resources such as energy and water. The Smart Power Fab of Infineon will make a decisive contribution to driving climate protection and digitalization forward by setting new efficiency standards for the consumption of important resources. The investment in Dresden is part of the company's strategy to reach CO_2-neutrality by 2030.

The Smart Power Fab is funded by the European Union, the Federal Republic of Germany and the Free State of Saxony. Sponsors: European Union, Federal Ministry for Economic Affairs and Climate Action on the basis of a resolution of the German Bundestag and the Saxon State Ministry for Economic Affairs, Labour and Transport.

Biography

Franziska Lindner is a Quality Manager at Infineon Dresden and coordinating sustainability measures in the design and construction of the new 300mm Smart Power Fab to produce analog/mixed-signal technologies and power semiconductors needed in automotive and renewable energy industries.
After completing her Master of Science in biology 2014, Franziska Lindner started as scientific associate supporting international process transfers and cleanroom capacity expansion. As head of manufacturing and quality officer, she built up pharmaceutical clean room production processes from quality as well as production perspectives. Franziska Lindner was born in Dresden, Germany, in 1989.

References

Thinking GREEN: ST CR300 and Lam Join forces to Develop Sustainability Improvements on Existing and Future Products

C. Villieu
Process Engineer
ST Microelectronics Crolles, Crolles, France

Body

Human and industrial activities are a driver of climate change, and growing needs of electronics devices make semiconductor manufacturing a significant contributor of Green houses gases emissions. Improving sustainability on existing and future microelectronics products is then an essential achievement for our industry. It has been shown and demonstrated several solutions to lower GHG emissions, key point is to deploy it to already installed base toolsets as LAM 2300 dry etching tools in STMicroelectronics Crolles. Clear Net Zero objectives allows motivated teams to work on such projects even without immediate ROI targets. Products improvements is ambitious and required rigorous methods to make persistent any achievements for next generation devices.

This project is based on measurement done by LAM with showing the most powerful GHG emissions contributors, confirmed by ST Crolles consumption studies. Using dedicated LAM softwares and life cycle analysis to estimate process impact, it allows to quantify any change effect. A clear and detailed method method has been used to established which processes could be optimized regarding harmful gaz rejection. Then solutions were tested directly in industrial environment which allows a fast reaction time and quick feedback on any trials.

On of the characteristic of semiconductor industry is its rapid expansion and fast changing capacity. Consequently, it is key to make any new sustainable solution adaptable to newest processes. By dedicating dry etching platform and joining ST R&D, production and LAM ressources, significant results were obtained which led to consequent reduction of GHG emisions on plasma etching modules.

Biography

Assessment Reports 6 about knowledge on climate change, IPCC, 2023
From Table 7.SM.7

References

Making the Fab Fit for the Future: Retrofit for Modern Technology, Security, and Maintenance Capability

N. Schulze
Product Manager Equipment Control and Integration
Kontron AIS GmbH, Product Management, Dresden, Germany

Body

The semiconductor industry is continuously evolving, driven by innovation, efficiency and scalability. To maintain competitiveness, not only the adoption of new equipment is required, but also the strategic retrofits of existing systems. Learn about the benefits of retrofitting semiconductor production equipment to enable their integration into modern production.

Prolonged Use of Existing Production Equipment

Retrofitting is cost efficient as they extend the operational life of current assets. Semiconductor manufacturing equipment is a substantial investment, and leveraging retrofits allows fabs to update these systems to support new process requirements, accommodate advanced materials and improve overall production capabilities. By updating not only the software of a legacy tool, but also outdated components, the risk to require no longer existing spare parts can be minimized.

Enhanced Technology Integration and Automation

Central to a successful retrofit is the integration of sophisticated equipment controls. The utilization of SECS/GEM, GEM300, and Equipment Data Acquisition (EDA) standards is essential. SECS/GEM standards ensure compatibility and interoperability across diverse equipment, while GEM300 standards support automation in 300mm fabs, enhancing throughput and efficiency. EDA further allows for detailed data analysis and predictive maintenance, contributing to higher yield and reduced downtime.

Improved Security and Maintenance

Retrofitting also addresses critical security concerns. Modern control software solutions more sophisticatedly support cybersecurity measures to protect against increasing threats. This is crucial for maintaining the integrity and confidentiality of proprietary manufacturing processes. Additionally, retrofits improve maintenance capabilities, incorporating regular tool updates. This is one step ahead to reach conformity with the cybersecurity standards SEMI E187 and E188.

Conclusion

In conclusion, retrofitting existing semiconductor production equipment with modern technology, security, and maintenance capabilities presents a strategic pathway for fabs aiming to remain competitive in a fast-evolving market. By leveraging advanced equipment control and integration software, fabs can achieve significant cost savings, improved performance, and enhanced security. Join us in exploring how retrofits can make your fab fit for the future, driving innovation and efficiency in semiconductor manufacturing.

Biography

With two years dedicated work as product manager for equipment control and integration software in the semiconductor industry at Kontron AIS, it is my aim to support OEMs and Fabs to tackle the major challenges we meet: a fast moving market, high speed innovations and keeping up with the pace.

References

Automotive Photonic Journey

W. Lex
Senior Vice President Mobility & Illumination
ams-OSRAM International GmbH, OS Mobility & Illumination, Regensburg, Germany

Body

Since 40 years the photonic developments have made huge progress from simple indicator lamps up to now LED in pixelated Headlamps and Stadium illumination. This disruptive change from incandescent lamps to solid state technologies was a result of very constructive collaboration between system providers, Semicon industries and end customers. Meanwhile, penetration of traditional light sources is more or less done. New photonics applications are on the horizon which will continue to change our way of life. Photonics journey just began.

Biography

Wolfgang Lex is Senior Vice President of the Business Line OS Mobility & Illumination at ams OSRAM. He has 40 years of experience in the semiconductor and automotive industry. He started his career at SIEMENS Semiconductor and joined OSRAM in 2002. Wolfgang Lex has held various management functions worldwide with a strong focus on automotive.

References