SMART Medtech

Welcome Remarks

L. Altimime
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.

Intersecting Paths: Uniting Moore's Law and Biology Through Bioconvergence

N. Siragusa
Merck KGaA, Science and Technology Office,
Darmstadt, Germany

Abstract
Intersecting Paths: Uniting Moore's Law and Biology Through Bioconvergence
For more than 4 billion years, nature has been perfecting its biological systems, developing solutions that scientists and engineers are just beginning to grasp and utilize. Leveraging synthetic biology, a myriad of applications - ranging from antibiotic development to laundry detergent enzymes, even to DNA data storage - have come to fruition.
Biological systems inherently possess the ability to self-assemble, self-repair, and self-replicate. This gives them an edge that critically affects capacity, precision, and cost-efficiency, metrics highly relevant in the material science as well as manufacturing process.

Recent technological developments allow us to read (sequence) and write (synthesize) DNA with greater ease and accuracy. This exponential advancement in our ability to 'program' DNA propels a technological revolution mirroring the computer surge of the 20th century and impacting manufacturing on a scale reminiscent of the 19th-century industrial revolution.
In the domain of synthetic biology, two fundamental design principles particularly stand out - the concept of reusable parts and the engineering design cycle. The engineering design cycle, also applied in the semiconductor industry, simplifies the engineering process into three stages: design, build, and test. This structure's ability to scale exponentially implies that we are now able to function within the framework of Moore's Law. This principle, established in computer manufacturing, indicates that capacity successfully doubles approximately every 2 years over extensive periods.
Moore's Law's relentless pace has become the benchmark for significant, long-term industrial progress. This pace is now attainable in gene synthesis. As we transition from conventional manufacturing to 'smart' manufacturing, we are harnessing the incredible compute power that Moore’s Law has provided for image and pattern recognition and massive data set analysis to drive manufacturing efficiency.

Biography
Dr. Nina Siragusa is the Chief of Staff to Dr. Laura Matz, the Chief Science and Technology Officer at Merck. As part of the Science and Technology Office Leadership Team, Nina is responsible for enabling and driving cross-sectoral collaboration, innovation strategy and digitalization at Merck across the 3 business sectors. She is leading the strategic efforts on Bioconvergence. As part of her MBA studies on Digital Transformation Management at the Goethe Business School, Frankfurt Germany, Nina is leading a project within the Group Smart Manufacturing Program.

Prior to becoming Chief of Staff, Nina has been driving corporate innovation as Biotechnology Lead of a synthetic biology innovation project, Senior Manager responsible for the creation of strategic alignment as well as building and management of high performing teams and finally as Associate Director responsible for targeted sourcing of innovative ideas, with the goal to generate new businesses.

Nina has a PhD in Biology from the University of Tuebingen, Germany. She has worked as a researcher in Europe and the USA at Yale University prior to joining Merck KGaA, Darmstadt Germany in 2016.

AI Engineering (B. Sc.) - Rethinking Applied AI Education

B. Rolf
Otto-von-Guericke-Universität Magdeburg,
Institute of Logistics and Material Handling
Systems, Magdeburg, Germany

Abstract
In the era of Industry 4.0, where advanced manufacturing processes are shaping industries like never before, the potential of AI cannot be ignored. To address this paradigm shift, the "AI Engineering" project, run at Institute of Logistics and Material Handling Systems at Otto-von-Guericke-University in Magdeburg, Germany, is a new way of teaching engineering. This fresh Bachelor's degree program, started in October 2023, mixes the study of Artificial Intelligence and engineering sciences together. The main goal is to teach students how to create advanced AI solutions that can be used in many different kinds of industries.

Thie AI Engineering program, which is supported by the German Federal Ministry of Education and Research, is part of a collaboration between Otto-von-Guericke-University Magdeburg and Anhalt, Harz, Magdeburg-Stendal, and Merseburg universities of applied sciences. Each university adds its own special knowledge to one of five important areas: Manufacturing, Production and Logistics; Green Engineering; Biomechanics and Smart Health Technologies; Mobile Systems and Telematics; and Agricultural Economy and Technology. By offering in-depth training in these domains, we ensure our graduates possess a deep understanding of both AI principles and domain-specific expertise.

At the core of AI Engineering is a hands-on, project-based learning approach that commences from the very first semester. We firmly believe that the best way to comprehend theory is by applying it to real-world challenges. Through close collaboration with regional and international companies, our students gain invaluable experience working on real use cases, utilizing actual datasets, and benefitting from industry mentorship.

Biography
Benjamin Rolf is a researcher specializing in supply chain management and logistics. He is currently pursuing a Ph.D. in Mechanical Engineering at Otto-von-Guericke-University Magdeburg, focusing on inventory management and reconfiguration in large-scale supply networks. He holds a Master's degree in Industrial Engineering Logistics and gained practical experiences when working for different manufacturing companies. His research interests lie at the intersection of supply chain management, simulation, network science, and machine learning. His contributions have been published in reputable journals and presented at international conferences. In 2024, he will continue his research as an expatriate at the RIKEN Center for Computational Science in Kobe, Japan.

Education
- 10/2019-06/2021 M. Sc. Industrial Engineering Logistics (with distinction) at Otto-von-Guericke-University Magdeburg, Germany
- 10/2020-06/2021 Special auditing student at Niigata University, Japan

Professional Experience
- 07/2021-Now: Researcher at Institute of Logistics and Material Handling Systems, Otto-von-Guericke-University Magdeburg
- 01/2024-06/2024: Expatriate at RIKEN Center for Computational Science, Kobe, Japan
- Internships/projects at BMW AG, LivingSolids GmbH, 4Flow AG, ...

Academic Publications
- International Journal of Production Research, Procedia Manufacturing, Hawaii International Conference on System Sciences, ...

Data Driven Optimization in Semiconductor Fabrication: How Business Efficiency Helps Environment as Well

T. Heller
GLOBALFOUNDRIES, Yield Engineering, Dresden, Germany

Abstract
The complexity of modern Semiconductor Fabrication requires a combination of the real- and the digital world.

Data driven optimization and digital manufacturing enable a new area to harvest savings related to energy consumption, material spending and efficiency regarding human capital.

These points equally improve cost efficiency of the supply and production chain, which also helps to spare the environment.

One example is an application that helps to detect consumption differences between semiconductor fabrication tools, another solution monitors the transport system.

A very different approach are our Physics-informed Digital Twins of semiconductor devices, which reduce computation times from hours per simulation to seconds for thousands samples.

The presented examples will show that there are opportunities in every area within semiconductor fabrication in which digital manufacturing can be used to harvest/enable savings that also protect our environment.

Biography
Dr. Thomas Heller started his professional career as a technician in a brown coal power plant, pretty much the opposite of a semiconductor clean room. After studying physics at BTU Cottbus, he earned his doctorate in Cottbus (Germany) and St. Andrews (Scotland).

Thomas joined AMD's Fab30/GF Fab1 Yield Engineering department in 2000. After bringing seven key technology nodes and several differentiated offerings to best-in-class yield levels, he has been responsible for all technologies in development and production since 2017. In 2020, Thomas also took over responsibility for Advanced Analytics & Machine Learning at GF Fab1 Dresden.

Thomas believes that yield engineering is one of the most interesting areas in the semiconductor industry because it provides comprehensive insight into customer, manufacturing and technology issues. By using advanced data analytics techniques, one can reach the next level of improving yield, quality and production efficiency.