EU DIGITAL FUTURE FORUM

Enhanced Chip manufacturing developments

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Abstract
The EU-funded Heterogeneous Integration for Connectivity and Sustainability (HICONNECTS) project develops the next generation of electronic components and systems as well as the heterogeneous integration of core technology solutions. Its objectives for IoT and automotive spaces include the transmission of IoT data over IT networks and the sensing of objects to enable highly automated driving. Part of a consortium of 64 partners from 15 countries, ST is developing activities around Industry 4.0 & Advanced Fab Digitalization. Focused on optimizing process and equipment performance, ST is working on the integration of heterogeneous IoT systems and data analytics demonstrators. We will show how upcoming technological advances will enhance the efficiency of the semiconductor industry with the deployment of a new stage of Industry 4.0.

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Biography

Daniele Pagano is Funding Project Manager at STMicroelectronics s.r.l.
He has covered various positions and responsibility in Catania Wafer Fab Operations (Litography, Dry Etching, APC & SPC, Epitaxy, Quality & Process Control), past experiences in collaborative projects like IMPROVE (2012), INTEGRATE (2015), MADEin4 (2022), SATURN (2023) and nowadays HiCONNECTS and IPCEI. He is author and co-author of several publications on journals and international conferences.

Dr. Giuseppe Fazio, graduated in physics at University of Milano. He has significant experience in industrial electronic devices and since 2000 he works in Semiconductor industries.
In semiconductor field Giuseppe has significant experiences in advanced process and equipment control.
He was APC/AEC group leader in STMicroelectronics, and holding the same position in Numonyx and in Micron from 2009 to 2013.
From 2016 to 2022 as Industrial Engineering project manager, in this position in charge of development and deployment Central Functions IE methodology and systems.
Today in Front End Manufacturing as project manager he coordinates programs aimed at maintaining and improving the performance of production equipment.
Past experiences in collaborative project, he is author and co-author of several publications and some patents.

Digital Twin Software for Finite Element Analysis.

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Abstract
Finite Element Analysis (FEA) has long been a pivotal tool in engineering and design, enabling the simulation of complex physical systems. However, as industries evolve towards greater complexity and integration, there is an increasing need for advanced software solutions that can enhance the capabilities of FEA. This presentation introduces the concept of Digital Twin Software for Finite Element Analysis (DT-FEA), a transformative approach that harnesses the power of digital twins to elevate the accuracy, efficiency, and comprehensiveness of FEA simulations.

DT-FEA bridges the gap between physical and digital realms by creating a virtual replica of a physical system. This digital twin faithfully captures not only the geometry but also the material properties, boundary conditions, and dynamic behavior of the real-world counterpart. It leverages real-time data integration, AI-driven analytics, and multidisciplinary modeling to continuously update and refine the digital twin's representation, ensuring its fidelity to the evolving physical system.

Key advantages of DT-FEA include:
1. Real-time Monitoring and Predictive Analysis: DT-FEA allows engineers and analysts to monitor the performance of physical systems in real time. By continuously comparing the digital twin's behavior to the actual system, deviations and anomalies can be detected early, facilitating predictive maintenance and reducing downtime.

2. Multidisciplinary Integration: DT-FEA enables the integration of multiple simulation domains, such as structural, thermal, fluid, and electromagnetic analysis, within a single platform. This holistic approach provides a comprehensive view of system behavior and interactions.

3. Optimization and Design Exploration: With DT-FEA, designers can explore a vast design space efficiently. Parametric studies and optimization algorithms can be applied to the digital twin, accelerating the development of innovative and efficient solutions.

4. Collaborative Decision-Making: DT-FEA supports collaborative decision-making by providing a common platform for engineers, designers, and stakeholders to interact with and analyze the digital twin. This fosters cross-functional collaboration and informed decision-making.

5. Reduced Cost and Risk: By enabling a deeper understanding of system behavior and performance, DT-FEA reduces the need for costly physical prototypes and mitigates the risk of unexpected failures or performance issues in real-world applications.

Biography
Rahul Tomar is a distinguished mechanical, civil, and software engineer with over 23 years of extensive experience in the field of engineering and technology. He is most notably recognized as the Co-Founder of *DigitalTwin Technology GmbH*, a groundbreaking company at the forefront of the digital twin revolution in the

engineering and construction sectors.

Rahul's profound understanding of mechanical and civil engineering principles, coupled with his expertise in software development, has played a pivotal role in the success of DigitalTwin Technology GmbH. He has spearheaded the development of innovative software solutions that bridge the gap between the physical and digital worlds, revolutionizing how engineers and designers approach their work.

Through his leadership, DigitalTwin Technology GmbH has enabled organizations across the globe to harness the power of digital twins for real-time monitoring, predictive analysis, and collaborative decision-making. These advancements have not only improved efficiency in engineering and construction projects but have also significantly reduced costs and risks associated with complex ventures.

Rahul Tomar's relentless pursuit of excellence and his unwavering dedication to pushing the boundaries of technology have left an indelible mark on the engineering and software development industries. His vision for the future of digital twin technology continues to drive innovation and transformation, making him a respected figure in the global engineering community.