Proposal for Special Session at IEEE CASE 2022

Goal:

- Semiconductor manufacturing is one of the most complex manufacturing processes. Due to the increased use of new technologies, the global economy is significantly impacted by the semiconductor industry. Competition in the semiconductor sector is fierce. As a result, the semiconductor industry needs to continually reinvent itself and be resourceful at all decision levels. Efficient design, analysis, and operation of semiconductor wafer manufacturing facilities and corresponding supply chains are essential.
- Various factors can disrupt certain chains of the production networks. For example, the global supply chain has been disrupted by the Covid-19 pandemic which spreads around the world, resulting, for instance, in chip shortage. All this has an impact on the production (product quality, supply, etc.). Subsequently, effective decisions must be taken to conduct production operations at different levels of the supply chain links while addressing disruptions.
- To ensure reliable results and reduced operational costs, highly automated manufacturing systems are used to carry out operations and make millions of decisions per day. This requires planning and scheduling methods in manufacturing execution systems (MES) and in logistics/supply chain management tools to support their automated operation. As new trends such as sustainable production, cloud computing, and Industry 4.0 emerge, they also need to be addressed.
- The development and application of planning and scheduling methods for these high-cost systems and supply-chains are critical elements in improving their operations. The purpose of the proposed session is to highlight cutting-edge research on semiconductor manufacturing planning, scheduling, and supply-chain management.

In particular, we seek contributions on the following topics among others:

- network planning in semiconductor supply chains
- demand planning for the semiconductor domain
- capacity planning and master planning for semiconductor supply chains
- operational planning approaches in the semiconductor domain
- reference models for semiconductor supply chain planning and control
- (automated) negotiation approaches
- models for the interactions between production and development
- novel scheduling approaches for semiconductor manufacturing
- flexibility and robustness in planning and scheduling
- machine learning and other artificial intelligence approaches for planning and scheduling.

Session Title: Novel Planning and Scheduling Approaches in Semiconductor Supply Chains

Organizers:

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Proposal 42 submitted to 2022 IEEE 18th International Conference on Automation Science and Engineering (CASE). Received February 27, 2022.

Contributions:

1. "Genetic Programming for Discovering Dispatching Rules for Energy-aware Batch Scheduling" by D. Schorn, L. Mönch

2. "Practical Queueing Models for Preventive Maintenance (PM) Plan Optimization: Multiple PM Types and Numerical Studies" by M. Lee, J. R. Morrison, A. Kalir

3. "Applications of the Digital Reference – the Semantic Web for Semiconductor and Supply Chains Containing Semiconductors" by H. Ehm, N. Ramzy, P. Ulrich

4. "Construction of an Ontology for operational risk in semiconductor manufacturing" by A. Khemiri and C. Yugma

5. "Integration of Transportation, storage in flexible Jos-Shop Scheduling" by L. Berterottiere, C. Yugma and S. Dauzère-Pérès

6. "Decentralized Decision Making for Managing Product Transitions in Semiconductor Manufacturing" by C. Leca, R. Uzsoy, and K. G. Kempf

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