Proposal for Special Session at IEEE CASE 2021

Goal:

The ***Advanced Process Control*** (APC) is an umbrella term including a spectrum of equipment and process analytics. Since its expansion in the 1990s as a tool dedicated to improving the competitiveness of manufacturing industries, APC has extended its capabilities from **detection** (past) to **diagnosis** (nowadays), and is striving towards expanding the **predictive** potential of the process and tool performance diagnosis. In the ***Industry 4.0*** era, the recent advances in high-performance computing technologies give rise to novel forms of industrial practices.

This special session focuses on the capability improvement into and around the scope of APC and its expanding ***from reactive to predictive modus operandi***, relying on the intensive use of data. Contributions from both the academic and the industrial communities are encouraged, ranging from empirical research/industrial applications to new methodologies mixing ***advanced technology, operation and data analytics***.

Topics of interest:

- *Advanced Process Control*
- Automated fault detection, diagnostics, and prognostics
- *Predictive maintenance, yield and tools performance*
- *Virtual metrology*
- Data science and data-driven automation
- Machine learning and artificial intelligence

Sponsors: This special session is sponsored by the MADEin4 project (https://madein4.eu/).

Session Title: **On enhancing predictive capabilities into and around Advanced Process Control**

Organizers:

Valeria BORODIN, Associate Professor
Mines Saint-Etienne
E-mail: valeria.borodin@emse.fr

Michel JUGE, Data Analyst
STMicroelectronics Rousset
E-mail: michel.juge@st.com

Delphine LE CUNFF, Metrology
STMicroelectronics Crolles
E-mail : delphine.le-cunff@st.com

Agnès ROUSSY, Professor
Mines Saint-Etienne
E-mail: agnes.roussy@emse.fr

Proposal 17 submitted to 2021 17th IEEE International Conference on Automation Science and Engineering (CASE). Received February 3, 2021.

Expected contributions:

1. Mines Saint-Etienne and STMicroelectronics Rousset: *Virtual metrology: An application to the Etch process*, by Rebecca CLAIN, Valeria BORODIN, Michel JUGE, Agnès ROUSSY
2. Mines Saint-Etienne and STMicroelectronics Rousset: *Feature selection for the next generation of APC*, by Oussamma DJEDIDI, Valeria BORODIN, Michel JUGE, Agnès ROUSSY
3. Aix-Marseille University and STMicroelectronics Rousset: *FDC Temporal Traces Anomaly Detection*, by Philip TCHATCHOUA, Michel JUGE
4. Mines Saint-Etienne and STMicroelectronics Crolles: *Multi-source multi-level data aggregation system for real-time diagnosis of process control* by Ilham RABHI, Aabir CHOUICHI, Francois PASQUALINI, Agnès ROUSSY
5. LTM-CNRS and STMicroelectronics Crolles: *IA approaches in Metrology to better detect and predict process deviation*, by Thomas ALCAIRE, Delphine LE CUNFF, Jean-Hervé Tortaï

Proposal 17 submitted to 2021 17th IEEE International Conference on Automation Science and Engineering (CASE). Received February 3, 2021.