ESREL 2025 Special Session – Call for papers

Data-driven predictive maintenance – from sensor measurements to diagnostics/prognostics to maintenance planning

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Contributors and Speakers, with preliminary topics addressed:

1. Marielle Stoelinga (Twente University, the Netherlands) - Formal methods for predictive maintenance
2. Zhanhang Li, David Coit, Chan Yang, Hani Nassif (Rutgers University, USA) – Diagnostics-driven maintenance for structures of bridges
3. Pedro Dias Longhitano, Benjamin Echard, Christophe Berenguer (University Grenoble Alps, France)) - Prescriptive maintenance and route planning for a fleet of degrading vehicles
4. Mihaela Mitici (Utrecht University, the Netherlands), Simon van Oosterom (TU Delft, the Netherlands) – Predictive maintenance for electric aircraft using prognostics
5. Zhiguo Zeng (University Paris Saclay, France) – The use of digital twins for predictive maintenance
6. Canh Hai VU (Compiègne University of Technology, France) – Anomaly detection using deep learning
7. Qingqing Zhai (Shanghai University, China) - Degradation Modeling and RUL Prediction in Dynamic Environments
8. Rui Kang (Beihang University, China) – Reliability-based design for predictive maintenance
9. Anne Barros, Mihaela Mitici – Reliability requirements for data-driven predictive maintenance

Motivation: The increasing availability of condition-monitoring data, together with advancements in machine learning and AI has incentivized, in the last several years, the development of Remaining-Useful-Life (RUL) prognostics and data-driven predictive maintenance planning models.

Objectives: This Special Session aims to gather researchers to discuss recent **advancements in predictive maintenance for complex systems** where maintenance tasks are planned based on Remaining-Useful-Life prognostics, anomaly detection, and/or availability of spare components. Objectives to be considered are, for example, trustworthiness of prognostics and risks associated with the use of prognostics for maintenance planning, the minimization of maintenance costs using data, reliability assurances for predictive maintenance, efficient usage of spare parts using predictive maintenance. The development of optimization models for predictive maintenance planning, diagnostics and prognostics, as well as ways to evaluate the impact of such approaches on costs, reliability and safety are highly encouraged. The development of data-driven RUL prognostics and optimization for maintenance planning are very welcome, together with a discussion on associated costs, reliability and/or safety. Applications to be considered are, but not limited to: aerospace, wind turbines, electric grids, automotives, batteries, digital twins.