European Safety and Reliability Conference
14–19 June 2026
Braga, Portugal

SS-16: Bayesian Networks Modelling for Reliability and Risk Assessment

Michael Beer[1], Matteo Broggi[1], Francesco Di Maio[2], and Enrico Zio[2,3]
[1] Leibniz University Hannover, Germany
[2] Polytechnic of Milan, Italy
[3] MINES Paris-PSL, France
beer@irz.uni-hannover.de; broggi@irz.uni-hannover.de; francesco.dimaio@polimi.it; enrico.zio@polimi.it

Description

Bayesian Networks are used for reliability and risk assessment, because of their capability of explicitly modeling systems/components dependencies while accounting for the uncertainties in their (stochastic) behaviour and the related modelling of it.

This special session aims at presenting the most recent advancements in Bayesian Network modelling for reliability and risk assessment, and the challenges and perspectives for its application in practice.

Topics of Interest:

Methodology:

- Multi-state Bayesian Networks
- Dynamic Bayesian Networks
- Uncertainty quantification in Bayesian Networks modelling
- Methods for the characterization of the Conditional Probability Tables (CPTs)

Applications:

- Critical Infrastructures (e.g., power, water, communication, transportation, airports)
- Safety-critical systems (e.g., nuclear, chemical, Oil&Gas)
- Aeronautics and Space engineering (e.g, airplanes, helicopters,…)
- Civil Engineering (e.g., bridges, roads, dikes, …)
- Healthcare Systems
- Cyber-Physical Systems
- Human reliability
- Ecological systems
- Climate change