37th International Conference on Principles of Diagnosis and Resilient Systems

DX 2026, September 1–3, 2026, Cork, Ireland

Edited by

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Preface

In 2026, the 37th International Conference on Principles of Diagnosis and Resilient Systems (DX'26) was hosted by University College Cork from September 1st to 3rd in Cork, Ireland. The DX conference has been a leading forum to present and discuss the latest research, experience reports, and emerging ideas related to diagnosis and resilient systems. Since DX is application-agnostic, the research presented covers a wide range of systems, from physical via biological to computational ones, represented as either abstract or detailed models. Starting with the 2024 edition, DX not only evolved from a workshop to a full conference, but also expanded its focus to include resilience systems. Directly connected to diagnostic issues, resilience in a system refers to a system's inherent ability to maintain its essential operations when faced with both expected and unforeseen challenges. Related aspects of interest to DX include resilient design as well as approaches that enable operational resilience. The topics covered in the DX conference thus include, but are not limited to:

- Monitoring, detection, diagnosis and mitigation of faults, unexpected issues and anomalies
- Formal theories and symbolic, sub-symbolic, as well as hybrid approaches to diagnosis
- Data-driven and learning-enabled methods for monitoring and diagnosis
- Connections between diagnosis and other techniques such as decision-making, (re-)planning, (re-)configuration, control, formal verification, and testing
- Theoretical concepts for design and operational resilience
- Designing, developing, and operationalizing resilient systems
- Hardware and software instrumentation for dependable data acquisition and probing
- Development, learning, abstraction, transformation, analysis, optimization, maintenance and transfer of diagnosis models
- Diagnosis in resilient, intelligent, and autonomous systems
- Diagnosis in a distributed, hierarchical, system-of-systems, or multi-agent context

For our 2026 edition, we received 29 submissions, ranging from extended abstracts to full papers and targeting the regular, DX Competition, and PhD panel tracks. This number includes two submissions that have been re-evaluated. For publication in these proceedings, we accepted 19 submissions, which entails an acceptance rate of 65.5%.

The manuscripts in these proceedings demonstrate the wide and innovative scope of research on diagnosis, prognosis, and resilient systems. Contributions include advances in methodology – such as temporal reasoning and planning or uncertainty considerations – as well as the incorporation of large language models for developing diagnostic models. The application areas are just as varied, covering control software, cyber-physical systems, or combustion and space rocket engines. Several studies highlight benchmarking and evaluation frameworks, like the revived DX Competition, a benchmark for fault isolation and diagnosis in production plants, and the systematic consideration or analysis of diagnostic algorithms and derived diagnoses. All these papers exemplify the theoretical depth as well as practical applications of diagnosis research, pointing towards the future integration of AI, multimodal reasoning, and resilience-by-design for enabling complex engineered systems.

A special highlight this year is that TIME, i.e., the International Symposium on Temporal Representation and Reasoning, organized by *Sophie Pinchinat* and *Andrea Orlandini*, chose to co-locate with DX. To honor the co-location, the program on September 2nd was shared between the two events, starting with a keynote given by *Alessandro Cimatti* from FBK, Italy,

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with the title *From Runtime Verification to Model-Based Diagnosis*. For the DX program, we could also secure an invited talk on *Engineering Resilience for Critical Infrastructure* given by *Utz Roenig* from UCC, Ireland.

Organizing a conference is always a team effort, so we would like to thank a few people. We start with the program committee members and thank them for their reviews that helped us select the right papers for our program and the subset accepted for these proceedings. We would like to specifically mention also our keynote speaker *Alessandro Cimatti*, the invited speaker *Utz Roedig*, the DX Competition committee (see below), as well as the DX Steering Committee (see below) for their essential contributions to the DX community and this conference. Further thanks go to the DX'26 award committee members, *Franz Wotawa*, *Oliver Niggemann* and *Marina Zanella*, who selected the awardees from the following four full papers that were nominated for receiving a best paper award (in a.o.):

- Early Failure Prediction from Near-Anomaly Detection: A Proactive Approach, *by Léa Billet, Louise Travé-Massuyès, Elodie Chanthery and Alexandre Gaffet*
- Hybrid Fault Detection and Isolation for the Fuel Turbopump Subsystem of the LOX/LNG Expander-Bleed Rocket Engine LUMEN, *by Eldin Kurudzija, Kai Dresia, Günther Waxenegger-Wilfing, Marcos Quinones-Grueiro, Austin Coursey and Gautam Biswas*
- On the Practical Utility of Diagnoses, *by Ingo Pill and Johan de Kleer*
- Reinforcement Learning-Driven Predictive Maintenance Planning via Timed Automata Modeling, *by Ferhat Tamssaouet, Pauline Ribot and Yannick Pencolé*

We congratulate the winners of the issued award(s) who were not known at the time of writing this preface. Special thanks go to Dagstuhl, our publisher, and the editors of the OASIcs series for collaborating with us to make our technical program available through open-access proceedings. Finally, we thank the authors for contributing to the success of this conference and the high quality of our archival proceedings. Without their work and their choice to present their most recent research at DX, this event would not have been possible.

The DX'26 chairs: Ingo Pill, Gregory Provan, Marina Zanella

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