

36th International Conference on Principles of Diagnosis and Resilient Systems

DX 2025, September 22–24, 2025, Nashville, TN, USA

Edited by

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■ Preface

In 2025, the 36th International Conference on Principles of Diagnosis and Resilient Systems (DX'25) was held from September 22nd to 24th in Nashville, United States, hosted by Vanderbilt University. The DX conference is a leading forum to present and discuss the latest research, experience reports, and emerging ideas related to diagnosis and resilient systems. DX is application-agnostic, meaning the research presented covers a wide range of systems, from physical to computational, represented either in abstract or detailed forms. Starting with the previous DX'24 edition and continuing onward, we expanded our focus from diagnosis to include resilience, which refers to a system's inherent ability to maintain its essential operations when faced with both expected and unforeseen challenges. DX welcomes papers that address resilient design as well as approaches for operational resilience.

Topics covered in the DX conference 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 for 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.
- Concept papers on the theory of design and operational resilience
- Designing, developing, and operationalizing resilient systems
- Hardware and software instrumentation, as well as dependable data acquisition and probing
- Development, learning, abstraction, transformation, analysis, optimization, 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 DX'25, we received 24 submissions in total, despite the feedback about the current economic difficulties in science and the reluctance to travel that we have been receiving from the DX community. The 24 submissions are split into 20 submissions by the regular deadline, and four submissions that were rejected but significantly revised and then resubmitted for the fast-track option. Out of the 20 original submissions, 1 (out of 1) was accepted for the PhD panel, and 2 (out of 2) were accepted for the DX competition track. Out of the remaining 17 submissions, 11 (64.7%) were accepted to be published with our DX'25 proceedings as regular papers. We received four resubmissions of rejected papers for the fast track and accepted one paper (25%) as regular paper and one (25%) as short paper. The overall acceptance rate is 66.7% (16 out of 24 papers).

The papers published in these proceedings demonstrate the broad and innovative scope of current research on diagnosis, prognosis, and resilient systems. Contributions include advancements in methodology – such as temporal reasoning, functional event calculus, hybrid system identification, multimodal and zero-shot learning, spectral receptive fields, and particle filtering – as well as the incorporation of large language models for developing diagnostic models, controller design, and fault detection. The application areas are just as varied, covering HVAC systems, radiotherapy machines, automotive die-casting, drones, and heat pumps. Several studies highlight benchmarking and evaluation frameworks, like the revived DX Competition and systematic analyses of diagnostic algorithms. Overall, these papers

highlight both the theoretical depth and practical applications of diagnosis research, pointing toward future integration of AI, multimodal reasoning, and resilience-by-design in complex engineered systems.

Organizing a conference is always a team effort, so we would like to thank a few people, starting with Gerilynn Pearce and Mary Margaret Sprinkle from our local support team at the Institute for Software Integrated Systems at Vanderbilt University. Special thanks to the Artificial Intelligence Journal for once again sponsoring DX'25 and to the program committee members for their reviews, which helped us select the right papers to create a high-quality technical program for the 36th International Conference on Principles of Diagnosis and Resilient Systems. We would like to specifically mention also our keynote speaker Sankaran Mahadevan, our two invited speakers Daniel Jung and Chetan Kukarni, the DX competition committee (see below), as well as the DX steering committee (see below) and the award committee chairs Louise Travé-Massuyès and Meir Kalech. We also appreciate Dagstuhl, our publisher, for collaborating with us to make the technical program available through open-access proceedings.

Finally, we would like to thank all the authors for contributing to the success of this conference. Without their work and their choice to present it at DX, this event would not have been possible.

The DX'25 chairs: Marcos Quinones-Grueiro, Gautam Biswas, Ingo Pill

■ Conference Organization

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