

35th International Conference on Principles of Diagnosis and Resilient Systems

DX 2024, November 4–7, 2024, Vienna, Austria

Edited by

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■ Preface

In 2024, the 35th International Conference on Principles of Diagnosis and Resilient Systems (DX) took place from November 4th to 7th in Vienna, Austria. For this DX edition, we saw two significant changes from previous ones. That is, for 35 years, DX has been known as the International Workshop on Principles of Diagnosis, but starting with the 2024 edition, DX is a full conference with formal open-access proceedings. Furthermore, we widened our primary focus to include also resilient systems – a research area that is tightly interconnected with research on diagnosis.

The DX conference is a premier forum to present and discuss the latest research, experience reports, and emerging ideas in the context of diagnosis and resilient systems. DX is application-agnostic, so that the presented research is related to a large variety of systems, ranging from physical to computational ones, captured in abstract or detailed representations. In previous DX iterations, the main focus was on diagnosis, i.e., the identification of root causes for encountered issues and unexpected scenarios, and on related techniques such as prognostics, planning, and control. Moving forward, we expanded our focus on diagnosis to include the topic of resilience, which is the intrinsic ability of a system to sustain its required operations when impacted by expected and unexpected contingencies. DX welcomes papers that cover resilient design as well as approaches for operational resilience. Topics covered by the DX conference include but are not limited to:

- Monitoring, detection, diagnosis, and mitigation of faults, unexpected issues, and change
- Formal theories and symbolic, sub-symbolic, as well as hybrid approaches for diagnosis
- Connections between diagnosis and other techniques like decision making, (re-)planning & (re-)configuration, control theory, formal verification, and testing
- Concept papers on the theory of design and operational resilience
- Designing, developing, and operationalizing resilient systems
- Hard- 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'24, we received 45 submissions in total, despite the organizational delays due to the relocation from Israel. Out of these 45, 42 papers underwent the reviewing process. 18 (40%) were finally accepted as full papers, 13 (28.9%) as short papers, and three submissions for the journal-first/major-conference-first track were accepted as extended abstracts.

The papers in these proceedings perfectly illustrate the diversity of research related to diagnosis and resilient systems. Their foci range from state estimation, via applications like robotics, electric motors, and heat pumps, to addressing fundamental questions. Examples for the latter are related to the integration of approaches from different fields, the application of the newest findings in other areas like LLMs for the benefit of diagnosis and resilient systems, or discussing upcoming challenges for the DX research of the future.

Organizing a conference is always a group effort, so that we would like to thank a few people, starting with Elisabeth Orthofer and Alexander Perko from our local support team from the Institute of Software Technology of the Graz University of Technology.

We would also like to thank the members of the DX steering committee that has been directing the transition of DX becoming a conference since it was founded in 2023:

- Ingo Pill (chair), Graz University of Technology, Austria
- Gautam Biswas, Vanderbilt university, USA
- Johan de Kleer, c-infinity, USA
- Meir Kalech, Ben Gurion University of the Negev, Israel
- Oliver Niggemann, Helmut-Schmidt-Universität Hamburg, Germany
- Louise Travé-Massuyès, LAAS-CNRS, France
- Franz Wotawa, Graz University of Technology, Austria
- Marina Zanella, Università di Brescia, Italy

Our thanks go also to the Graz University of Technology and the Ben Gurion University of the Negev for supporting the organizers in their efforts to make the conference happen. Special thanks go to the AI Journal for sponsoring DX'24 and to the members of the program committee for their reviews that allowed us to single out the right papers to constitute a high-quality technical program for the 35th International Conference on Principles of Diagnosis and Resilient Systems. We would furthermore like to thank Dagstuhl, our publisher, for working with us to make the technical program available via open-access proceedings.

Finally, we would like to thank all the paper 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'24 chairs: Ingo Pill, Avraham Natan, and Franz Wotawa.

■ Conference Organization

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