35th International Conference on Principles of Diagnosis and Resilient Systems

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

Edited by

Ingo Pill
Avraham Natan
Franz Wotawa

Editors

Ingo Pill
Institute of Software Technology, Graz University of Technology, Austria
ingo.pill@gmail.com

Avraham Natan
Ben-Gurion University of the Negev, Israel
natanavr@post.bgu.ac.il

Franz Wotawa
Institute of Software Technology, Graz University of Technology, Austria
wotawa@ist.tugraz.at

ACM Classification 2012
Computing methodologies → Causal reasoning and diagnostics

ISBN 978-3-95977-356-0

Published online and open access by
Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at https://www.dagstuhl.de/dagpub/978-3-95977-356-0.

Publication date
November, 2024

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at https://portal.dnb.de.

Digital Object Identifier: 10.4230/OASIcs.DX.2024.0

ISBN 978-3-95977-356-0 **ISSN 1868-8969** **https://www.dagstuhl.de/oasics**

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ISSN 1868-8969

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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.

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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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List of Authors

Guillaume Alcalay
Airbus Operations S.A.S
Toulouse, France
guillaume.alcalay@airbus.com

Luis Alvarez
MIT Lincoln Laboratory
Lexington, MA, United States
luis.alvarez@ll.mit.edu

David Axelsson
Linköping University
Linköping, Sweden
davidaxelsson5@gmail.com

Rahma Bengamra
LAAS
Toulouse, France
rahma.bengamra@laas.fr

Gautam Biswas
Vanderbilt University
Nashville, TN, United States
gautam.biswas@vanderbilt.edu

Marco Bozzano
Fondazione Bruno Kessler
Povo, Italy
bozzano@fbk.eu

Gregory Brouillet
BOSCH France
France
gregory.brouillet@fr.bosch.com

Elodie Chanthery
LAAS-CNRS, University of Toulouse
Toulouse, France
elodie.chanthery@laas.fr

Alessandro Cimatti
Fondazione Bruno Kessler
Trento, Italy
cimatti@fbk.eu

Austin Coursey
Vanderbilt University
Nashville, TN, United States
austin.c.coursey@vanderbilt.edu

Marco De Bortoli
Graz University of Technology
Graz, Austria
mbortoli@ist.tugraz.at

Johan de Kleer
c-infinity
United States
johan@dekleer.org

Jan Deeken
German Aerospace Center (DLR)
Hardthausen am Kocher, Germany
jan.deeken@dlr.de

Abel Diaz-Gonzalez
Vanderbilt University
Nashville, TN, United States
abel.diaz.gonzalez@vanderbilt.edu

Alexander Diedrich
Helmut Schmidt University
Hamburg, Germany
alexander.diedrich@hsu-hh.de

Roman Dumitrescu
Paderborn University
Paderborn, Germany
roman.dumitrescu@iem.fraunhofer.de

Jonas Ehrhardt
Helmut-Schmidt University
Hamburg, Germany
jonas.ehrhardt@hsu-hh.de

Soheib Fergani
LAAS
Toulouse, France
soheib.fergani@laas.fr

Goerschwin Fey
Hamburg University of Technology
Hamburg, Germany
goerschwin.fey@tuhh.de

Manuel Freiberger
Silicon Austria Labs (SAL)
Graz, Austria
manuel.freiberger@silicon-austria.com

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Leo Fürbaß
Graz University of Technology
Graz, Austria
leo.fuerbass@student.tugraz.at

Charles-Maxime Gauriat
LAAS-CNRS, BOSCH France
Toulouse, France
charlesmaxime.gaurait@fr.bosch.com

Andreas Gerhardus
German Aerospace Center (DLR)
Hardthausen am Kocher, Germany
andreas.gerhardus@dlr.de

Maxence Glotin
LAAS-CNRS, Université de Toulouse
Toulouse, France
maxence.glotin@laas.fr

Fatemeh Hashemniya
Linköping University
Linköping, Sweden
Fatemeh.Hashemniya@liu.se

René Heesch
Helmut-Schmidt University
Hamburg, Germany
rene.heesch@hsu-hh.de

Lukas Heppel
University of Würzburg, German Aerospace Center (DLR)
Würzburg, Germany
lukasheppel00@gmail.com

Thomas Hirsch
Graz University of Technology
Graz, Austria
thirsch@ist.tugraz.at

Birgit Hofer
Graz University of Technology
Graz, Austria
bhofer@ist.tugraz.at

Elaheh Hosseinkhani
University of Lübeck
Lübeck, Germany
hosseinkhani@isp.uni-luebeck.de

Dietmar Jannach
University of Klagenfurt
Klagenfurt am Wörthersee, Austria
dietmar.jannach@aau.at

Carine Jauberthie
LAAS-CNRS, Université de Toulouse, UPS
Toulouse, France
carine.jauberthie@laas.fr

Daniel Jung
Linköping University
Linköping, Sweden
daniel.jung@liu.se

Meir Kalech
Ben-Gurion University of the Negev
Beer-Sheva, Israel
kalech@bgu.ac.il

David Kaufmann
Graz University of Technology
Graz, Austria
david.kaufmann@ist.tugraz.at

Lorenz Klampfl
Graz University of Technology
Graz, Austria
lklampfl@ist.tugraz.at

Matus Kozovsky
Brno University of Technology
Brno, Czechia
matus.kozovsky@ceitec.vutbr.cz

Mattias Krysander
Linköping University
Linköping, Sweden
mattias.krysander@liu.se

Chetan S. Kulkarni
NASA Ames Research Center
Mountain View, CA, United States
chetan.s.kulkarni@nasa.gov

Gianfranco Lamperti
University of Brescia
Brescia, Italy
gianfranco.lamperti@unibs.it

Martin Leucker
University of Lübeck
Lübeck, Germany
leucker@isp.uni-luebeck.de

Lucas Gabriel Lima Lopes
Airbus Operations S.A.S, LAAS-CNRS
Toulouse, France
lucas-gabriel.lima-lopes@airbus.com

Björn Ludwig
Helmut Schmidt University
Hamburg, Germany
ludwigb@hsu-hh.de

Silke Merkelbach
Fraunhofer IEM
Paderborn, Germany
silke.merkelbach@iem.fraunhofer.de

Lukas Moddemann
Helmut-Schmidt University
Hamburg, Germany
lukas.moddemann@hsu-hh.de

Herbert Mühlburger
Graz University of Technology
Graz, Austria
muehlburger@ist.tugraz.at

Adil Mukhtar
Graz University of Technology
Graz, Austria
amukhtar@ist.tugraz.at

Stalin Muñoz Gutiérrez
Graz University of Technology
Graz, Austria
sgutierr@ist.tugraz.at

Avraham Natan
Ben-Gurion University of the Negev
Beer-Sheva, Israel
natanavr@post.bgu.ac.il

Oliver Niggemann
Helmut-Schmidt-Universität / Universität der Bundeswehr Hamburg
Hamburg, Germany
info@oliver-niggemann.de

Yannick Pencolé
LAAS-CNRS
Toulouse, France
yannick.pencole@laas.fr

Ingo Pill
Graz University of Technology
Graz, Austria
ingo.pill@gmail.com

Swantje Plambeck
Hamburg University of Technology
Hamburg, Germany
swantje.plambeck@tuhh.de

Liliana Marie Prikler
Graz University of Technology
Graz, Austria
liliana.prikler@ist.tugraz.at

Marcos Quinones-Grueiro
Vanderbilt University
Nashville, TN, United States
marcos.quinones.grueiro@vanderbilt.edu

Ferdinand Rewicki
German Aerospace Center (DLR)
Hardthausen am Kocher, Germany
ferdinand.rewicki@dlr.de

Pauline Ribot
LAAS-CNRS
Toulouse, France
pribot@laas.fr

Patrick Rodler
University of Klagenfurt
Klagenfurt am Wörthersee, Austria
patrick.rodler@aau.at

Inbal Roshanski
Ben-Gurion University of the Negev
Beer-Sheva, Israel
inbalros@post.bgu.ac.il

Magenya Roshanski
Maris-Tech Ltd
Rehovot, Israel
mgr@maris-tech.com

Martin Sachenbacher
University of Lübeck
Lübeck, Germany
sachenba@googlemail.com

Maximilian Schmidt
Hamburg University of Technology
Hamburg, Germany
maximilian.schmidt@tuhh.de

Albert Schulz
Accemic Technologies GmbH
Kiefersfelden, Germany
aschulz@accemic.com

Gerald Schweiger
Vienna University of Technology
Vienna, Austria
gerald.schweiger@tuwien.ac.at

Tran Cao Son
New Mexico State University
Las Cruces, NM, United States
tson@cs.nmsu.edu

Gerald Steinbauer-Wagner
Graz University of Technology
Graz, Austria
steinbauer@ist.tugraz.at

Roni Stern
Ben-Gurion University of the Negev
Beer-Sheva, Israel
roni.stern@gmail.com

Henrik Sebastian Steude
Helmut-Schmidt-University
Hamburg, Germany
henrik.steude@hsu-hh.de

Hendrik Streichhahn
Dräger Safety AG & Co. KGaA.
Germany
hendrik.streichhahn@draeger.com

Audine Subias
LAAS-CNRS
Toulouse, France
subias@laas.fr

Anna Sztyber-Betley
Warsaw University of Technology
Warsaw, Poland
anna.sztyber@pw.edu.pl

Erich Teppan
University of Klagenfurt
Klagenfurt am Wörthersee, Austria
erich@ifit.uni-klu.ac.at

Louise Travé-Massuyès
LAAS-CNRS, Université de Toulouse
Toulouse, France
louise@laas.fr

Stefano Trerotola
University of Brescia
Brescia, Italy
stefano.trerotola@outlook.it

Andrea Urgolo
Silicon Austria Labs (SAL)
Graz, Austria
andrea.urgolo@silicon-austria.com

Lars Bernd Vosteen
University of Lübeck
Lübeck, Germany
lars.vosteen@isp.uni-luebeck.de

Daniel Vranješ
Helmut-Schmidt-University
Hamburg, Germany
daniel.vranjes@hsu-hh.de

Günther Waxenegger-Wilfing
German Aerospace Center (DLR)
Hardthausen am Kocher, Germany
guenther.waxenegger@dlr.de

Alexander Weiss
Accemic Technologies GmbH
Kiefersfelden, Germany
aweiss@accemic.com

Franz Wotawa
Graz University of Technology
Graz, Austria
wotawa@ist.tugraz.at

William Yeoh
Washington University in St. Louis
St. Louis, MO, United States
wyeoh@wustl.edu

Marina Zanella
University of Brescia
Brescia, Italy
marina.zanella@unibs.it

Xiangfu Zhao
Yantai University
Yantai, Shandong, China
xiangfuzhao@gmail.com