

Sixth Workshop on Next Generation Real-Time Embedded Systems

NG-RES 2025, January 20, 2025, Barcelona, Spain

Edited by

Patrick Meumeu Yomsi

Stefan Wildermann



Editors

Patrick Meumeu Yomsis 

CISTER Research Centre, ISEP, Porto, Portugal
pmy@isep.ipp.pt

Stefan Wildermann 

Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen, Germany
stefan.wildermann@fau.de

ACM Classification 2012

Computer systems organization → Real-time systems; Computer systems organization → Embedded and cyber-physical systems; Software and its engineering → Software notations and tools; Networks

ISBN 978-3-95977-366-9

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/978-3-95977-366-9>.

Publication date

March, 2025

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>.

License

This work is licensed under a Creative Commons Attribution 4.0 International license (CC-BY 4.0): <https://creativecommons.org/licenses/by/4.0/legalcode>.



In brief, this license authorizes each and everybody to share (to copy, distribute and transmit) the work under the following conditions, without impairing or restricting the authors' moral rights:

- Attribution: The work must be attributed to its authors.

The copyright is retained by the corresponding authors.

Digital Object Identifier: 10.4230/OASlcs.NG-RES.2025.0

ISBN 978-3-95977-366-9

ISSN 1868-8969

<https://www.dagstuhl.de/oasics>

OASlcs – OpenAccess Series in Informatics

OASlcs is a series of high-quality conference proceedings across all fields in informatics. OASlcs volumes are published according to the principle of Open Access, i.e., they are available online and free of charge.

Editorial Board

- Daniel Cremers (TU München, Germany)
- Barbara Hammer (Universität Bielefeld, Germany)
- Marc Langheinrich (Università della Svizzera Italiana – Lugano, Switzerland)
- Dorothea Wagner (*Editor-in-Chief*, Karlsruher Institut für Technologie, Germany)

ISSN 1868-8969

<https://www.dagstuhl.de/oasics>

■ Contents

Preface	
<i>Patrick Meumeu Yonsi and Stefan Wildermann</i>	0:vii
List of Authors	
.....	0:ix
Papers	
Programming Time-Predictable Processors with Lingua Franca	
<i>Magnus Mæhlum, Erling Rennemo Jellum, Shaokai Lin, Marten Lohstroh,</i> <i>Martin Schoeberl, Sverre Hendseth, and Edward A. Lee</i>	1:1–1:13
Low-Latency Real-Time Applications on Heterogeneous MPSoCs	
<i>Nicolas Coppik, Pascal Becker, and Marcus Ritter</i>	2:1–2:14
Co-Design of Systems-On-Chip for Sustainability	
<i>Jan Spieck, Dominik Walter, Jan Waschkeit, and Jürgen Teich</i>	3:1–3:12
H-MBR: Hypervisor-Level Memory Bandwidth Reservation for Mixed Criticality Systems	
<i>Afonso Oliveira, Diogo Costa, Gonçalo Moreira, José Martins, and</i> <i>Sandro Pinto</i>	4:1–4:15
SP-IMPact: A Framework for Static Partitioning Interference Mitigation and Performance Analysis	
<i>Diogo Costa, Gonçalo Moreira, Afonso Oliveira, José Martins, and</i> <i>Sandro Pinto</i>	5:1–5:15

■ Preface

On behalf of the Technical Program Committee, we are delighted to welcome you to the *Proceedings of the 6th Edition of the Workshop on Next Generation Real-Time Embedded Systems (NG-RES 2025)*, held in Barcelona, Spain, on January 20, 2025.

The NG-RES workshop series focuses on real-time embedded systems, with special emphasis on distributed and parallel aspects. It serves as a meeting place for the networking and multicore real-time communities and fosters cross-disciplinary collaboration and innovation in embedded system design.

Key topics covered at NG-RES 2025 included, but were not limited to:

- Application of formal methods to distributed and/or parallel real-time systems
- Programming models, paradigms, and frameworks for real-time computation on parallel and heterogeneous architectures
- Dependable systems and networks
- Machine learning techniques for designing real-time systems
- Applications of approximate computing in real-time systems
- Compiler-assisted solutions for distributed and/or parallel real-time systems
- Middleware for distributed and/or parallel real-time systems
- Networking protocols and services (e.g., clock synchronization) for distributed real-time embedded systems
- Scheduling and schedulability analysis for distributed and/or parallel real-time systems
- System-level software and technologies (e.g., RTOSs, hypervisors, separation kernels, virtualization) for parallel and heterogeneous architectures

We would like to express our heartfelt gratitude to all those involved in the organization of the workshop. In particular, we would like to thank the General Chair, Federico Terraneo, and the Submission and Web Chair, Daniele Cattaneo. We would also like to express our special appreciation to the Program Committee members listed below, whose commitment and hard work were instrumental in shaping the workshop program:

- Jaume Abella Ferrer, Barcelona Supercomputing Center, Spain
- Luís Almeida, Universidade do Porto, Portugal
- Daniel Casini, Scuola Superiore Sant'Anna, Italy
- Dakshina Dasari, Robert Bosch GmbH, Germany
- Khalil Esper, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
- Deepak Gangadharan, International Institute of Information Technology, Hyderabad
- John Harrison Kurunathan, University of Porto, Portugal
- Ahlem Mifdaoui, University of Toulouse, France
- Marc Pouzet, École normale supérieure, Paris, France
- Mubarak Ojewale, King Abdullah University of Science and Technology (KAUST), Saudi Arabia
- Amit Kumar Singh, University of Essex, United Kingdom
- Marco Solieri, Minerva Systems and Università di Modena e Reggio Emilia, Italy
- Jürgen Teich, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

We also thank our publisher Schloss Dagstuhl as well as the HiPEAC organizers for contributing to the success of this workshop. Finally, we sincerely thank all the authors who contributed to NG-RES 2025. Their valuable research and insights made this workshop possible!

Patrick Meumeu Yomsi and Stefan Wildermann

Sixth Workshop on Next Generation Real-Time Embedded Systems (NG-RES 2025).


Editors: Patrick Meumeu Yomsi and Stefan Wildermann




OpenAccess Series in Informatics


Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany


■ List of Authors


Pascal Becker  (2)
ABB AG Corporate Research Center,
Mannheim, Germany


Nicolas Coppik  (2)
ABB AG Corporate Research Center,
Mannheim, Germany


Diogo Costa  (4, 5)
Centro ALGORITMI / LASI,
Universidade do Minho, Portugal


Sverre Hendseth  (1)
Norwegian University of Science and Technology,
Trondheim, Norway

Erling Rennemo Jellum  (1)
University of California, Berkeley, CA, USA


Edward A. Lee  (1)
University of California, Berkeley, CA, USA


Shaokai Lin  (1)
University of California, Berkeley, CA, USA


Marten Lohstroh  (1)
University of California, Berkeley, CA, USA


José Martins  (4, 5)
Centro ALGORITMI / LASI,
Universidade do Minho, Portugal

Gonçalo Moreira  (4, 5)
Centro ALGORITMI / LASI,
Universidade do Minho, Portugal


Magnus Mæhlum  (1)
Norwegian University of Science and Technology,
Trondheim, Norway


Afonso Oliveira  (4, 5)
Centro ALGORITMI / LASI,
Universidade do Minho, Portugal


Sandro Pinto  (4, 5)
Centro ALGORITMI / LASI,
Universidade do Minho, Portugal

Marcus Ritter  (2)
ABB AG Corporate Research Center,
Mannheim, Germany

Martin Schoeberl  (1)
Technical University of Denmark, Denmark

Jan Spieck  (3)
Friedrich-Alexander-Universität
Erlangen-Nürnberg (FAU), Germany

Jürgen Teich  (3)
Friedrich-Alexander-Universität
Erlangen-Nürnberg (FAU), Germany

Dominik Walter  (3)
Friedrich-Alexander-Universität
Erlangen-Nürnberg (FAU), Germany

Jan Waschkeit (3)
Friedrich-Alexander-Universität
Erlangen-Nürnberg (FAU), Germany

