

# **13th International Workshop on Worst-Case Execution Time Analysis**

**WCET'13, July 9, 2013, Paris, France**

Edited by  
**Claire Maiza**



*Editor*

Claire Maiza  
Grenoble INP, Verimag  
Grenoble, France  
[claire.maiza@imag.fr](mailto:claire.maiza@imag.fr)

*ACM Classification 1998*

B.8.2 Performance Analysis and Design Aids, C.3 Real-time and embedded systems, D.2.4 Software/Program Verification

**ISBN 978-3-939897-54-5**

*Published online and open access by*

Schloss Dagstuhl – Leibniz-Zentrum für Informatik GmbH, Dagstuhl Publishing, Saarbrücken/Wadern, Germany. Online available at <http://www.dagstuhl.de/dagpub/978-3-939897-54-5>.

*Publication date*

July, 2013

*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 <http://dnb.d-nb.de>.

*License*

This work is licensed under a Creative Commons Attribution 3.0 Unported license (CC-BY 3.0): <http://creativecommons.org/licenses/by/3.0/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/OASIcs.WCET.2013.i

**ISBN /978-3-939897-54-5**

**ISSN 2190-6807**

**<http://www.dagstuhl.de/oasics>**

## OASIcs – OpenAccess Series in Informatics

OASIcs aims at a suitable publication venue to publish peer-reviewed collections of papers emerging from a scientific event. OASIcs 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 2190-6807**

**[www.dagstuhl.de/oasics](http://www.dagstuhl.de/oasics)**



## Contents

Evaluation of resource arbitration methods for multi-core real-time systems <i>Timon Kelter, Tim Harde, Peter Marwedel and Heiko Falk</i>	1
Automatic WCET Analysis of Real-Time Parallel Applications <i>Haluk Ozaktas, Christine Rochange, and Pascal Sainrat</i>	11
Integrated Worst-Case Execution Time Estimation of Multicore Applications <i>Dumitru Potop-Butucaru and Isabelle Puaut</i>	21
Program Semantics in Model-Based WCET Analysis: A State of the Art Perspective <i>Mihail Asavoae, Claire Maiza, and Pascal Raymond</i>	32
Multi-architecture Value Analysis for Machine Code <i>Hugues Cassé, Florian Birée, and Pascal Sainrat</i>	42
The Auspicious Couple: Symbolic Execution and WCET Analysis <i>Armin Biere, Jens Knoop, Laura Kovács, and Jakob Zwirchmayr</i>	53
Upper-bounding Program Execution Time with Extreme Value Theory <i>Francisco J. Cazorla, Tullio Vardanega, Eduardo Quiñones, and Jaume Abella</i>	64
PRADA: Predictable Allocations by Deferred Actions <i>Florian Haupenthal and Jörg Herter</i>	77
Static analysis of WCET in a satellite software subsystem <i>Jorge Garrido, Juan Zamorano, and Juan A. de la Puente</i>	87
Applying Measurement-Based Probabilistic Timing Analysis to Buffer Resources <i>Leonidas Kosmidis, Tullio Vardanega, Jaume Abella, Eduardo Quiñones, and Francisco J. Cazorla</i>	97



## Message from the workshop chair

On July 9, 2013, the 13th International workshop on Worst-Case Execution Time Analysis (WCET 2013, <http://wcet2013.imag.fr>) will be held in Paris, France. The workshop is being organised as a satellite workshop of the 25th Euromicro conference on Real-Time Systems (ECRTS'13, <http://ecrts13.ecrts.org>). I am therefore grateful to the ECRTS'13 general chair, Laurent Georges, his local team, and the Real-Time Technical Committee Chair of the Euromicro, Gerhard Föhler, for their work.

The papers that will be presented at the workshop have been selected based on peer reviews by program committee members and external reviewers, all experts in the field. 10 submissions out of 17 were finally selected for presentation. This document contains the presented papers.

I am happy to thank the authors, the program committee including external reviewers, the WCET workshop steering committee for assembling the components of a very successful workshop. The workshop organizers are also deeply grateful to the EU COST Action IC1202: Timing Analysis On Code-Level (TACLe) for financial support. Special thanks to Heiko Falk and Mihail Asavoae for their help.

Claire Maiza

---





# ■ Committees

## Program Committee

Guillem Bernat  
Rapita Systems, UK

Hugues Cassé  
IRIT – Université de Toulouse, France

Francisco J Cazorla  
Barcelona Supercomputing Center, Spain

Heiko Falk  
Ulm University, Germany

Kevin Hammond  
University of St Andrews, UK

Damien Hardy  
IRISA, France

Chris Healy  
Furman University, USA

Niklas Holsti  
Tidorum Ltd, Finland

Björn Lisper  
Mälardalen University, Sweden

Tulika Mitra  
National University of Singapore, Singapore

Stefan Petters  
CISTER/IPP Hurray, Porto, Portugal

Peter Puschner  
Technische Universität Wien, Austria

Jan Reineke  
Saarland University, Germany

Christine Rochange  
IRIT – Université de Toulouse, France

Tullio Vardanega  
University of Padua, Italia

## Steering Committee

Guillem Bernat  
Rapita Systems Ltd., UK

Jan Gustafsson  
Mälardalen University, Sweden

Isabelle Puaut  
University of Rennes 1 / IRISA, France

Peter Puschner  
Vienna University of Technology, Austria

## External Reviewers

Mihail Asavoea  
Grenoble University / Verimag, France

Marc Boyer  
Onera, France

Bekim Cilku  
Vienna University of Technology, Austria

Andreas Gustavsson  
Mälardalen University, Sweden

Benedikt Huber  
Vienna University of Technology, Austria

Daniel Prokesch  
Vienna University of Technology, Austria

