

# **2015 IEEE 21st International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA 2015)**

**Hong Kong, China  
19 – 21 August 2015**



**IEEE Catalog Number: CFP15066-POD  
ISBN: 978-1-4673-7856-7**

# 2015 IEEE 21st International Conference on Embedded and Real-Time Computing Systems and Applications

## RTCSA 2015

### Table of Contents

Welcome Message from the RTCSA 2015 Conference

Chairs .....	viii
Conference Organizers .....	ix
Steering Committee .....	x
Program Committee .....	xi
Reviewers List .....	xiv

---

#### Session 1

On the Soft Real-Time Optimality of Global EDF on Multiprocessors: From Identical to Uniform Heterogeneous .....	1
<i>Kecheng Yang and James H. Anderson</i>	
Bounding Carry-in Interference to Improve Fixed-Priority Global Multiprocessor Scheduling Analysis .....	11
<i>Nan Guan, Meiling Han, Chuancai Gu, Qingxu Deng, and Wang Yi</i>	
Enhanced Fault-Tolerant Fixed-Priority Scheduling of Hard Real-Time Tasks on Multi-core Platforms .....	21
<i>Qiushi Han, Tianyi Wang, and Gang Quan</i>	

#### Session 2

Schedulability Analysis for Real-Time P-FRP Tasks under Fixed Priority Scheduling .....	31
<i>Yu Jiang, Albert M.K. Cheng, and Xingliang Zou</i>	
Smart2: Smart Charging for Smart Phones .....	41
<i>Alma Pröbstl, Philipp Kindt, Emanuel Regnath, and Samarjit Chakraborty</i>	
C3: Cooperative Code Positioning and Cache Locking for WCET Minimization .....	51
<i>Fuyang Li, Mengying Zhao, and Chun Jason Xue</i>	

### Session 3

Fair-Share Scheduling for Performance-Asymmetric Multicore Architecture via Scaled Virtual Runtime .....	60
<i>Myungsun Kim, Soonhyun Noh, Sungju Huh, and Seongsoo Hong</i>	
Memory Pressure Balancing on Virtualized Servers .....	70
<i>Jui-Hao Chiang, Tzi-Cker Chiueh, and Han-Lin Li</i>	
A Cloud-Based Offloading Service for Computation-Intensive Mobile Applications .....	80
<i>Bo-Kai Huang, Chih-Chuan Cheng, Chun-Han Lin, and Pi-Cheng Hsiu</i>	

### Session 4—Invited

### Session 5

Responsive and Enforced Interrupt Handling for Real-Time System Virtualization .....	90
<i>Hyoseung Kim, Shige Wang, and Ragunathan (Raj) Rajkumar</i>	
Bi-Level Deadline Scaling for Admission Control in Mixed-Criticality Systems .....	100
<i>Alejandro Masrur, Dirk Müller, and Matthias Werner</i>	
Overhead-Aware Schedulability Evaluation of Semi-Partitioned Real-Time Schedulers .....	110
<i>Pedro Souto, Paulo Baltarejo Sousa, Robert I. Davis, Konstantinos Bletsas, and Eduardo Tovar</i>	

### Session 6

Hard Real-Time Multiprocessor Scheduling Resilient to Core Failures .....	122
<i>Borislav Nikolić, Konstantinos Bletsas, and Stefan M. Petters</i>	
On Component-Based Software Development for Multiprocessor Real-Time Systems .....	132
<i>Nima Khalilzad, Moris Behnam, and Thomas Nolte</i>	
A Memory Access Detection Methodology for Accurate Workload Characterization .....	141
<i>Marco Cesati, Renato Mancuso, Emiliano Betti, and Marco Caccamo</i>	
End-to-End Timing Analysis of Black-Box Models in Legacy Vehicular Distributed Embedded Systems .....	149
<i>Saad Mubeen, Mikael Sjödin, Thomas Nolte, John Lundbäck, Mattias Gålnander, and Kurt-Lennart Lundbäck</i>	
Reconfigurable Communication Middleware for Flex Ray-Based Distributed Embedded Systems .....	159
<i>Diptesh Majumdar, Licong Zhang, Purandar Bhaduri, and Samarjit Chakraborty</i>	
Ballroom Intersection Protocol: Synchronous Autonomous Driving at Intersections .....	167
<i>Reza Azimi, Gaurav Bhatia, Ragunathan (Raj) Rajkumar, and Priyantha Mudalige</i>	

## Session 7—Invited

### Session 8

Techniques for Schedulability Analysis in Mode Change Systems under Fixed-Priority Scheduling .....	176
<i>Wen-Hung Huang and Jian-Jia Chen</i>	
EDF Schedulability Analysis on Mixed-Criticality Systems with Permitted Failure Probability .....	187
<i>Zhishan Guo, Luca Santinelli, and Kecheng Yang</i>	
Schedulability Analysis for Real-Time Task Set on Resource with Performance Degradation and Periodic Rejuvenation .....	197
<i>Xiayu Hua, Chunhui Guo, Hao Wu, Douglas Lautner, and Shangping Ren</i>	

### Session 9

Improving WCET Analysis Precision through Automata Product .....	207
<i>Vincent Mussot and Pascal Sotin</i>	
Tracing Flow Information for Tighter WCET Estimation: Application to Vectorization .....	217
<i>Hanbing Li, Isabelle Puaut, and Erven Rohou</i>	
Priority-Based Functional Reactive Programming (P-FRP) Using Deferred Abort .....	227
<i>H.C. Wong and A. Burns</i>	

### Session 10

A Stochastic Response Time Analysis for Communications in On-chip Networks .....	237
<i>Meng Liu, Moris Behnam, and Thomas Nolte</i>	
Exploiting Job Response-Time Information in the Co-Design of Real-Time Control Systems .....	247
<i>Yang Xu, Karl-Erik Årzén, Anton Cervin, Enrico Bini, and Bogdan Tanasa</i>	
EDF-PStream: Earliest Deadline First Scheduling of Preemptable Data Streams—Issues Related to Automotive Applications .....	257
<i>Akihiro Yamaguchi, Yukikazu Nakamoto, Kenya Sato, Yousuke Watanabe, and Hiroaki Takada</i>	
<b>Author Index</b> .....	268