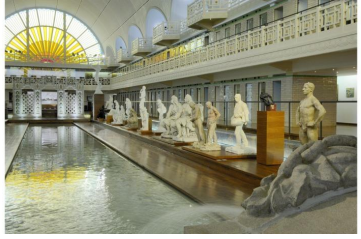

23rd International Conference on

Real-Time Networks and Systems

&

9th Junior Researcher Workshop on Real-Time Computing

http://rtns2015.lifl.fr

RTNS 2015

Lille, France

November 4-6, 2015

RÉGION NORD-PAS DE CALAIS

CRIStAL
Centre de Recherche en Informatique, Signal et Automatique de Lille

Université de Lille 1 SCIENCES ET TECHNOLOGIES

ICPS Published by ACM

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9th Junior Researcher Workshop on Real-Time Computing (JRWRTC) 15

RTNS 2015

Real-Time Networks and Systems 2015

http://rtns2015.lifl.fr/

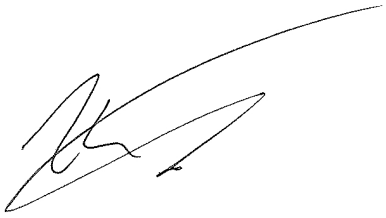
Lille, 4-6 November 2015

Welcome message

RTNS is a very open conference with a great sense of community and a friendly atmosphere that presents excellent opportunities for collaboration. The purpose of the conference is to share your experience, your latest ideas, and latest research results with fellow researchers, developers, and professionals in the field of real-time networks and systems.

We hope that the conference with its associated events will inspire new ideas, provide you the opportunity for discussion, and will allow you to define future plans of joint research.

We very much hope you will enjoy your stay in Lille!



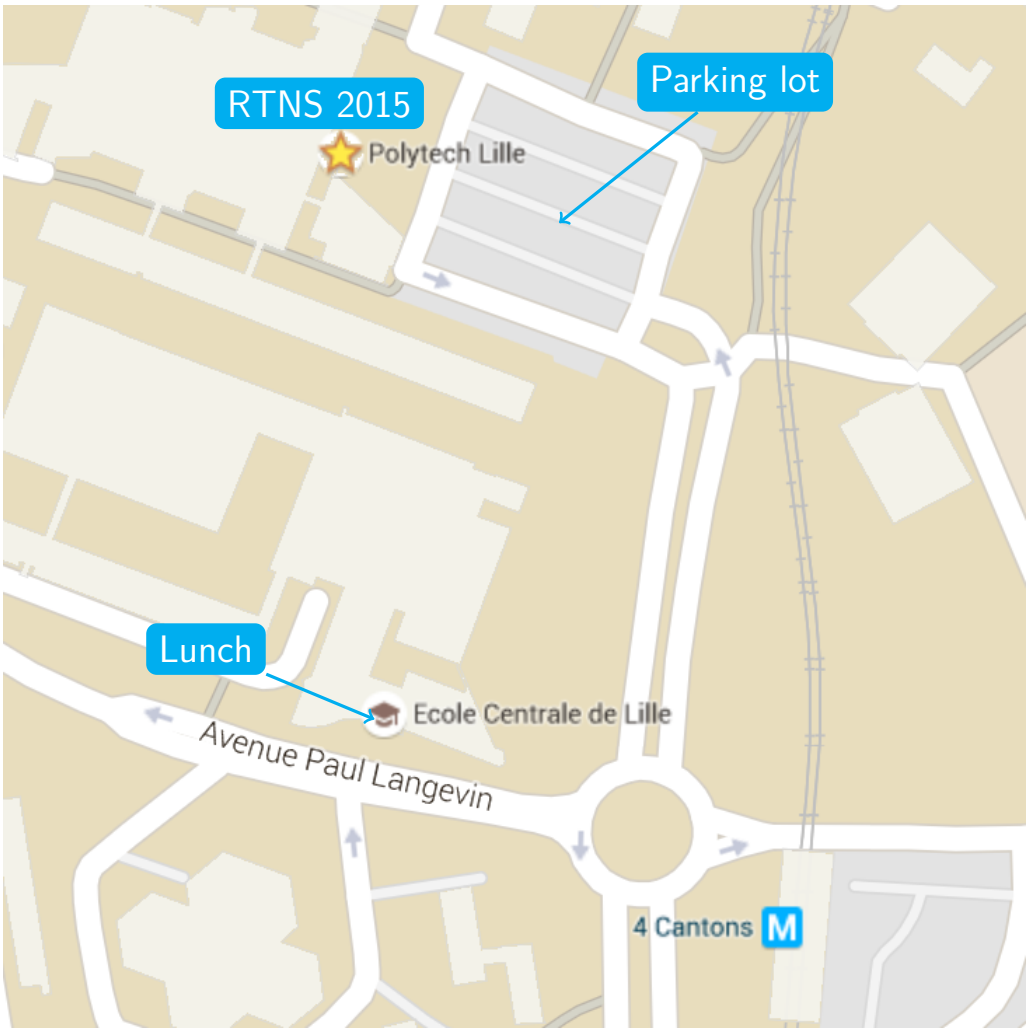
Julien Forget (Université de Lille)

Local organisation committee

Giuseppe Lipari
Clément Ballabriga
Antoine Bertout
Houssam Zahaf
Khalil Hamzaoui

Venue and conference information

The conference will be held at the Polytech Lille, located in the Campus de l'Université de Lille 1. Google Maps: **https://goo.gl/maps/jgr2Be8AgaP2**.



From metro stop "4 Cantons" to Polytech.

Address
Polytech Lille
Avenue Paul Langevin
59655 Villeneuve d'Ascq

Registration The registration desk is located in the main hall of the building, where the conference will take place. Upon arrival all participants are kindly requested to go to the RTNS 2015 Registration Desk in order to collect their badges.

Polytech main entrance

Conference room The conference will be held in the **Amphitheatre Appert** located at the ground floor, whereas the poster session will take place in the main hall.

Lunch The lunch will be served at the *École Centrale* (see map), room B14-B15.

Coffee breaks The coffee breaks are served in room Pasteur at Polytech (just in front of the conference room).

Proceedings The proceedings are available through the ACM Digital Library. Conference participants may also download the proceedings until the end of the conference using a login/password which you can find in your bag:
http://rtns2015.lifl.fr/participant/

Wi-Fi access Please connect to the `PolytechGuest` network id. The network is protected with WPA-PSK with a password that changes everyday. The three passwords are provided inside the conference bag. Before using Internet, it is necessary open the browser on any web page: you will be redirected to a page where you will be asked to accept the terms and conditions.

The University of Lille and Polytech participate in the **Eduroam** and **Eduspot** projects, which should allow many participants to immediately connect without any prior configuration.

How to reach the conference location

By plane

- The closest airport is the Lille Airport (Lesquin - LIL). From there, there is a shuttle to the "Lille Flandres" train station, duration 20 minutes.
- It is possible to land in Charles de Gaulle (CDG) airport, and then take a fast train to one of the two train stations in Lille: "Gare de Lille Flandres" or "Gare de Lille Europe".
- It is also possible to land in the airport of Charleroi (CRL) in Belgium, and then take a bus to Lille (duration: 1 hour 15 minutes). Please consult the Flibco bus company web site for more information: **http://www.flibco.com**

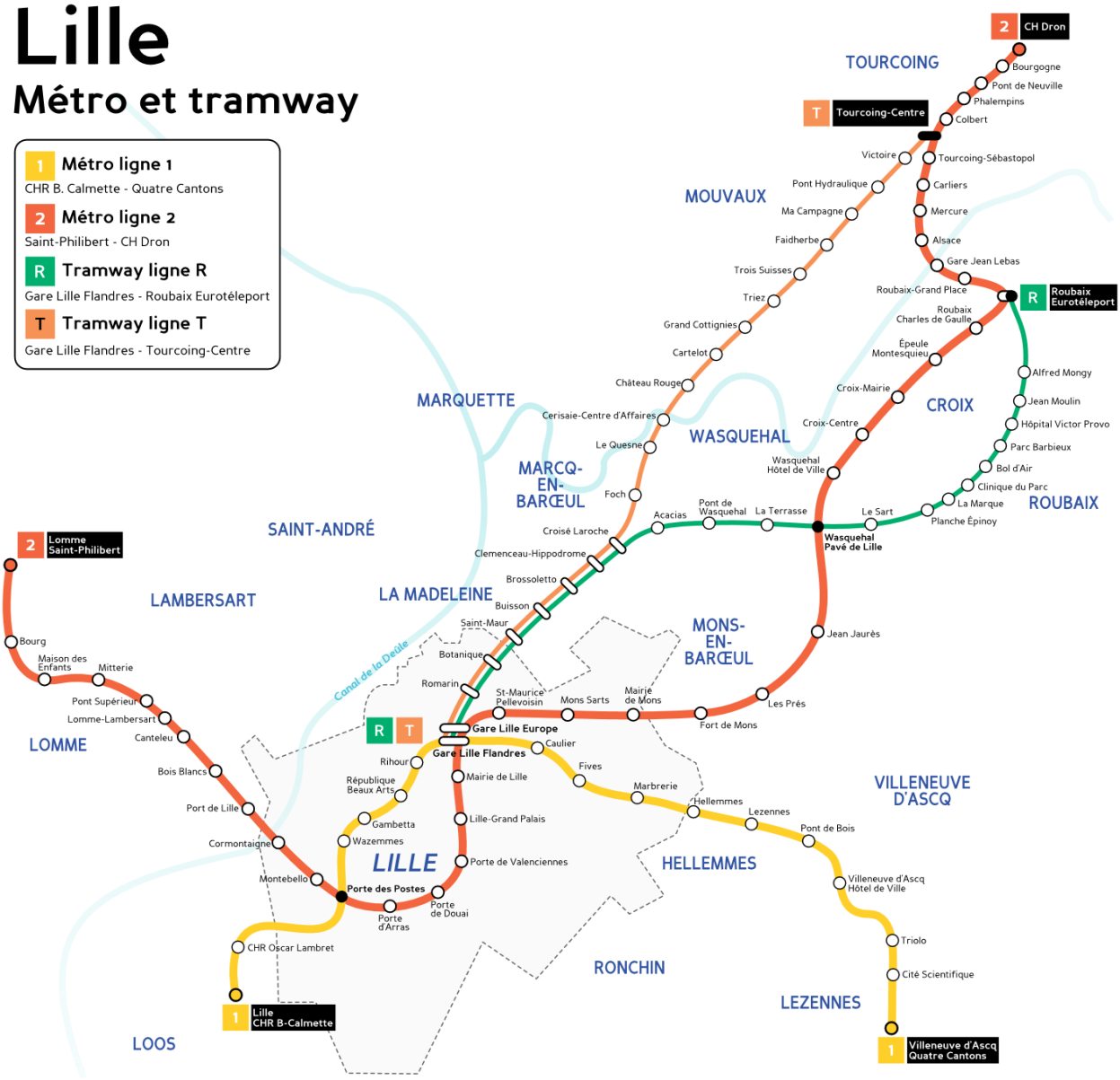
By train There are two train stations in Lille: "Gare de Lille Flandres" and "Gare de Lille Europe". They are both located in the city center at 500 meters from one another. There are frequent connections from Paris Gare du Nord (travel time of approximately 1 hour), from London St. Pancras (1 hour 30 minutes) and from Bruxelles Midi (35 minutes).

By metro The conference location can be reached easily and comfortably by metro. The Lille Metro network is managed by Transpole (**https://www.transpole.fr/**), and it consists of two lines, the yellow line (Ligne 1) and the red line (Ligne 2). The Polytech is close to the last stations of the yellow line, called "4 Cantons – Grand Stade". Metro stations are all over the city centre, and in particular in the two train stations. From "Gare Lille Flandres" to "4 Cantons – Grand Stade", the travel time is of approximately 20 minutes. Automatic ticket machines are available in every metro stations. The price for a one-way ticket is of 1,50 €, and for 10 tickets is 12,50 €.

By car Lille is easily reachable by car through the A1 highway from Paris (about 250km), and from Bruxelles (about 120km).

By taxi Some taxi companies in Lille:

- *Taxi Union* – Tel: 03 20 06 06 06
- *Taxi Lille Métropole* – Tel: 06 62 32 49 24
- *Taxi Flandres* – Tel: 06 05 05 05 01



Plan of the Lille metro and tram network. The conference location is close to station *4 Cantons – Grand Stade*, at the lower-right end of the yellow line.

Useful information

Money/currency

Credit cards are accepted in many shops, hotels, and restaurants (there is usually a minimum amount between 7 to 15 €).

For cash, you will find ATMs on just about every street corner (24 hours a day). Banks, exchange bureaus, and some post offices handle currency exchange and also accept traveler's checks. Whatever you are buying, prices are net. A gratuity is however customary in restaurants and for certain services (e.g., taxis).

Emergency phone number

Dial the following numbers (toll-free)

- Medical emergencies (SAMU): 15
- Police emergency: 17
- Fire-brigade: 18
- European emergency call: 112

Calling

- To make a call within France: 0 + area number + number
- Calls to France from abroad: 00 + 33 + number
- To make an international call: 00 + country code + number

Electric standards

220 Volts - 380 Volts / 50 Hertz

Health Insurance and Health Emergencies

The organisers will accept no liability for personal injuries sustained by or for loss or damage to property belonging to conference participants, either during or as a result of the conference or during any related events. Participants are strongly recommended to seek accident and health insurance, as well as insurances covering lost luggage and trip cancellation.

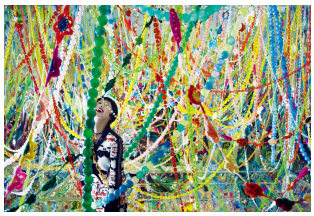
Social event

This year we propose a guided tour of two exhibitions in the context of Lille Renaissance.

Lille was **European Capital of Culture** in 2004. After the great success of that event, the municipality decided to continue to invest in culture with **Lille 3000**: every 3 or 4 years the city organises a series of cultural events around one central theme. *Lille Renaissance* is the 4th edition of Lille 3000. Among the many different cultural events, we propose the guided visit of two exhibitions:

Tu dois changer ta vie!
(You must change your life!)

This exhibition explores many different topics: progress of science, philosophy, new technologies, ... with a path designed as a game made of randomness and choices, which places the spectator as the main actor.



Séoul, vite, vite !
(Seoul, quick, quick!)

Séoul, vite, vite ! will immerse the visitor into the energy, the dynamism, the modernity and the popular culture of South Korea, through the eyes of different surprising artists. The title of this exhibition is the translation of a expression frequently used in Korea: "Seoul, bbali, bbali". This phrase has a double meaning: joyful and dynamic at first, for many koreans also denotes an excessively fast modernisation, source of many problems.

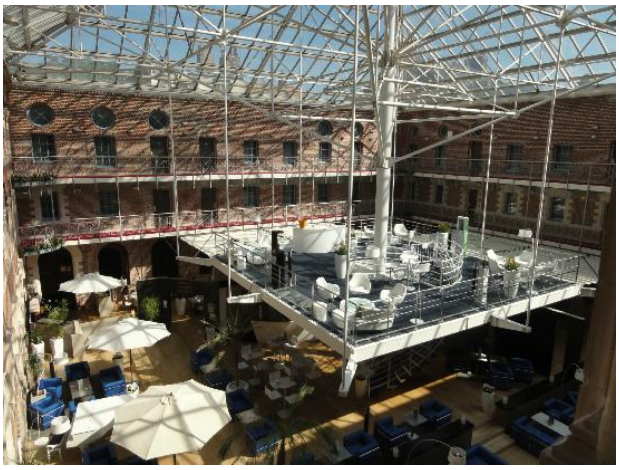
Location

The meeting point is inside the hall of *Tripostal*, Avenue Willy Brandt, just behind the train station "Gare de Lille Flandres" (see map) at **15:45**.

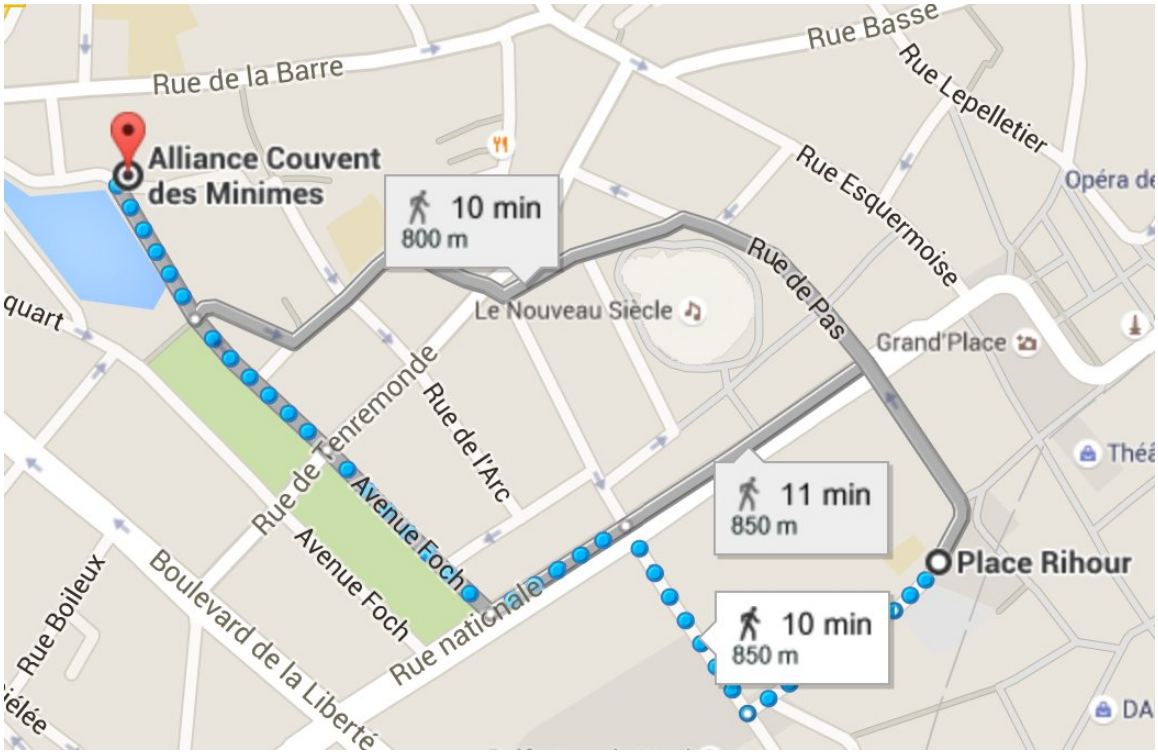
Please, be on time!

Banquet

The banquet will be hosted at the *Alliance Couvent des Minimes*, starting at **20:00**.



It is possible to walk to the place from the *Rihour* metro station or from the *Grand Place* (see map).



Alliance Couvent des Minimes, 17 quai du Wault, Lille

Program overview

Wed. 4th	Thur. 5th	Fri. 6th
8:00 Registration		
9:00 Welcome and Opening Remarks	**9:00** Session 4 Outstanding papers	**9:00** Session 7 Multiprocessor II
9:30 Keynote Talk L. S. Indrusiak		
10:30 Coffee break	**10:40** Coffee break	**10:15** Coffee Break
11:00 Session 1 Multiprocessors I	**11:15** Session 5 On-chip networks	**10:45** Session 8 Mixed Criticality
12:15 Lunch	**12:30** Lunch	**12:25** Lunch
13:45 Session 2 Probabilistic Analysis	**14:00** Session 6 WCET	**14:00** Session 9 Networks
15:25 Coffee Break	**15:15** Social Event	**15:15** Coffee Break
15:55 Session 3 Multi-Stage Scheduling		**15:35** Session 10 Non preemptivity and control
17:15 Junior Workshop		**16:30** Goodbye Speech and Best Presentation award
18:20 Cocktail & posters	**19:00** Banquet	

Wednesday 4th November

8:00 **Registration**

9:00 Welcome and Opening Remarks

9:30 Keynote Talk

Network-on-Chip Platforms for Real-Time Mixed-Criticality Application
Leandro Soares Indrusiak

10:30 Coffee break

11:00 Session 1 : Multiprocessor I

- A Contention-Sensitive Fine-Grained Locking Protocol for Multiprocessor Real-Time Systems
  Catherine Jarrett, Bryan Ward and James Anderson.
- Multiprocessor Fixed Priority Scheduling with Limited Preemptions
  Abhilash Thekkilakattil, Rob Davis, Radu Dobrin, Sasikumar Punnekkat and Marko Bertogna.
- Iterative Robust Multiprocessor Scheduling
  Shreya Adyanthaya, Marc Geilen, Twan Basten, Jeroen Voeten and Ramon Schiffelers.

12:15 Lunch

13:45 Session 2: Probabilistic Analysis

- A Framework For The Evaluation Of Measurement-based Timing Analyses
  Benjamin Lesage, David Griffin, Frank Soboczenski, Iain Bate and Rob Davis.
- Joint Management of Processing and Cooling Power Based on Inaccurate Thermal Information in a Stochastic Real-Time System
  Mehdi Ghasemi, Morteza Mohaqeqi and Mehdi Kargahi.
- Study of the Reliability of Statistical Timing Analysis for Real-Time Systems
  Dorin Maxim, Frank Soboczenski, Iain Bate and Eduardo Tovar.
- Modelling Fault Dependencies when Execution Time Budgets are Exceeded
  David Griffin, Benjamin Lesage, Iain Bate, Frank Soboczenski and Robert I.

15:25 Coffee break

15:55 Session 3: Multi-Stage scheduling

- Analysis for Supporting Real-Time Computer Vision Workloads using OpenVX on Multicore + GPU Platforms
  Kecheng Yang, Glenn Elliott and James Anderson
- Memory-Processor Co-Scheduling in Fixed Priority Systems
  Alessandra Melani, Marko Bertogna, Vincenzo Bonifaci, Alberto Marchetti-Spaccamela and Giorgio Buttazzo.
- Resource Reservation for Real-Time Self-Suspending Tasks: Theory and Practice
  Alessandro Biondi, Alessio Balsini and Mauro Marinoni.

17:15 Junior Presentations

18:15 Cocktail and posters

Thursday 5th November

9:00 Session 4 - Outstanding Papers

- Scheduling with preemption delays: anomalies and issues
  Guillaume Phavorin, Pascal Richard, Joël Goossens, Thomas Chapeaux and Claire Maiza.
- Efficient Context Switching for the Stack Cache: Implementation and Analysis
  Sahar Abbaspour, Florian Brandner, Amine Naji and Mathieu Jan.
- A Generic and Compositional Framework for Multicore Response Time Analysis
  Sebastian Altmeyer, Robert I. Davis, Leandro Soares Indrusiak, Claire Maiza, Vincent Nelis and Jan Reineke.
- How realistic is the mixed-criticality real-time system model?
  Alexandre Esper, Geoffrey Nelissen, Vincent Nélis and Eduardo Tovar.

10:40 Coffee break

11:15 Session 5 - On-chip Networks

- Flexible TDM-Based Resource Management in On-Chip Networks
  Adam Kostrzewa, Selma Saidi, Leonardo Ecco and Rolf Ernst.
- Hard Real-time Guarantee of Automotive Applications during Mode Changes *Piotr Dziurzanski, Amit Singh, Leandro Indrusiak and Björn Saballus.*
- Improved Priority Assignment for Real-Time Communications in On-Chip Networks
  Meng Liu, Matthias Becker, Moris Behnam and Thomas Nolte.

12:30 Lunch

14:00 Session 6 - WCET

- WCET Analysis in Shared Resources Real-Time Systems with TDMA Buses
  Hamza Rihani, Matthieu Moy, Claire Maiza and Sebastian Altmeyer.
- WCET Analysis for Multi-Core Processors with Shared Buses and Event-Driven Bus Arbitration
  Michael Jacobs, Sebastian Hahn and Sebastian Hack.

15:15 Social Event

20:00 Banquet (RTNS'2015 Awards)

Friday 6th November

9:00 Session 7 - Multiprocessors II

- Response Time Analysis for G-EDF and G-DM Scheduling of Sporadic DAG-Tasks with Arbitrary Deadline
  Andrea Parri, Alessandro Biondi and Mauro Marinoni.
- Response Time Bounds for Sporadic Arbitrary-Deadline Tasks under Global Fixed-Priority Scheduling on Multiprocessors
  Wen-Hung Kevin Huang and Jian-Jia Chen.
- An Exact Schedulability Test for Global FP Using State Space Pruning
  Artem Burmyakov, Enrico Bini and Eduardo Tovar.

10:15 Coffee Break

10:45 Session 8 - Mixed Criticality

- Mixed Criticality Systems with Weakly-Hard Constraints
  Oliver Gettings, Sophie Quinton and Robert Davis.
- The concurrent consideration of uncertainty in WCETs and processor speeds in mixed criticality systems
  Zhishan Guo and Sanjoy Baruah
- Semi-partitioned Model for Dual-core Mixed Criticality System
  Hao Xu and Alan Burns.
- Generalized Mixed-Criticality Scheduling based on RUN
  Romain Gratia, Thomas Robert and Laurent Pautet.

12:25 Lunch

14:00 Session 9 - Networks

- On Priority Assignment for Controller Area Network when some Message Identifiers are Fixed
  Robert Davis, Alan Burns, Victor Pollex and Frank Slomka.
- Time-Division Multiplexing vs Network Calculus: A Comparison
  Wolfgang Puffitsch, Rasmus Bo Sørensen and Martin Schoeberl.
- A Reliability-Aware Medium Access Control for Unidirectional Time-Constrained WSNs
  Philip Parsch and Alejandro Masrur.

15:15 Coffee break

15:35 Session 10 - Non-Preemptivity and Control

- Non-Work-Conserving Scheduling of Non-Preemptive Hard Real-Time Tasks Based on Fixed Priorities
  Mitra Nasri and Gerhard Fohler.
- Worst-Case Performance Validation of Safety-Critical Control Systems with Dropped Samples
  Tobias Bund and Frank Slomka.

16:30 Goodbye speech, BEST PRESENTATION AWARD . . . and see you at RTNS'2016

9th Junior Researcher Workshop on Real-Time Computing (JRWRTC)

Date: November 4th - 17:15 - 18:15
Program Chair: Benjamin Lesage

1. Failure tolerance for a multicore real-time system scheduled by PD2
   Yves Marcellin Mouafo Tchinda, Annie Geniet-Choquet and Gaëlle Largeteau-Skapin
2. Discussion on the Spectral Analysis of Real-Time Multi-Path Tasks
   Fabrice Guet, Luca Santinelli and Jérôme Morio
3. Scheduling of parallel applications on many-core architectures with caches: bridging the gap between WCET analysis and schedulability analysis
   Viet Anh Nguyen, Isabelle Puaut and Damien Hardy
4. A Comparative Study of the Precision of Stack Cache Occupancy Analyses
   Amine Naji and Florian Brandner
5. ASLA: Adaptive System Level in AUTOSAR
   Amel Belaggoun, Ansgar Radermacher and Valerie Issarny
6. Towards Utilizing Reconfigurable Shared Resources in Multi-Core Hard Real-Time Systems
   Luca Pezzarossa, Martin Schoeberl and Jens Sparsø
7. Regulation versus Flow Control in NoC for Hard Real-time Systems: a Preliminary Case Study
   Hamdi Ayed, Jean-Luc Scharbarg, Jérôme Ermont and Christian Fraboul

component-based approaches
Scheduling
space
multi-cores
Real-time
formal methods
cyber physical systems
programming languages
RTOS
wireless sensor networks
networks
reliability
embedded devices
mixed criticality
telecommunications
railways
compilers
hardware
power aware systems
software engineering
safety
Verification
Schedulability analysis
fault tolerance
WCET
Modelling
avionics
automotive
aerospace