CISTER Quicknews

APRIL - JUNE ISSUE, 2019

+SCIENCE +EUROPE

On the 27th of March of 2019, **Eduardo Tovar** participated in the round-table "How to double the Portuguese presence in the European programmes?... from GPPQ role to the PERIN dynamization", as part of the PERIN 2019 days "+Science +Europe".

PERIN is the Portugal in Europe Research and Innovation Network, and GPPQ is the National Office for Promotion of the Framework Programme for RTD.

Besides **Eduardo Tovar**, CISTER Labs Director, the panel also had the participation of Eduardo Maldonado, President of ANI (National Innovation Agency); Rui Pedrosa, IP Leiria's President; Carlos Borrego from University of Aveiro and PERIN coordinator; Han Brezet from TU Delft; Ruaidhri Neavyn, Adviser on Higher Education Policy from Higher Education Authority (HEA) & Department of Education and Skills (DES) in Ireland; Carlos Salema from Telecommunications Institute; Marco Lemos from IPLeiria and João Sobrinho Teixeira, Secretary of State for Science, Technology and Higher Education.

The focus of the debate was to strengthen new European networks in the areas of science, technology and higher education and digital transformation, in close proximity with research and innovation activities, such as improving the Portuguese participation in Horizon Europe, the next European framework programme for research and innovation.

PORTUGAL SPACE VISIT TO AIRBUS DEFENCE AND SPACE (ADS)

On the 21st of May, CISTER's **Eduardo Tovar** participated, within the Portuguese delegation, in the visit to Airbus Defence and Space (ADS) in Toulose, in the framework of the recently created portuguese space agency "Portugal Space".

The event, which aimed at promoting future collaborations in the aerospace areas, was led by Manuel Heitor, Minister of Science, Technology and Higher Education of Portugal; and also included high-level representatives of several Portuguese industries, research centers and clusters.

The Portuguese delegation also included the recently appointed President of the Portuguese Space Agency Chiara Manfletti, a well-known person within the space industry and European Space Agency.

The teams from Airbus Defence and Space (ADS) were led by the Executive Vice-President Nicolas Chamussy.

In the photo: Manuel Heitor, Portugal's Minister for Science, Technology and Higher Education; **Célia Reis**, Altran Portugal CEO; **Manuel Barbosa**, from HASLab/INESC TEC; **Cyril Roger**, Altran's Group Vice-President; **Eduardo Tovar**, CISTER Labs Research Centre Director and **Susana Moreira** from Altran [representative of the VORTEX executive comission] at the VORTEX launching.

VORTEX, THE COLLABORATIVE LABORATORY IN CPS, WAS OFFICIALLY LAUNCHED

On the 29th of March of 2019, VORTEX - an Acceleration and Technology Transfer Center of Cyber-Physical Systems in Cyber Security in Portugal, was formally presented in the headquarters of Altran Portugal, in Lisbon.
VORTEX aims to create a collaborative ecosystem between research centers, startups and industrial leaders that explore emerging technologic trends and that apply them in the development of new products that address the new market challenges.
Lead by Altran Portugal, VORTEX is an associaton that has as founding

members the Polytechnic Institute of Porto/School of Engineering (ISEP/IPP) represented by CISTER (Research Centre in Real-Time and Embedded Computing Systems), the Universidade Nova de Lisboa (UNL) represented by NOVALincs, the Systems and Computer Engineering Institute - Tecnology & Science (INESC TEC) represented by HASLab, and the Innovation Platform Beta-i.
The importance of VORTEX in the Portuguese Industrial and Academic ecosystem was recognized by the Minister of Science and Tecnology and Higher Education, Manuel Heitor, who stated that "VORTEX represents the creation of employment

with digital transformation, by a new type of institutions that will stimulate the risk-sharing between public and private sectors to invest in the employment knowledge and co-creation".
CISTER is a key partner in the VORTEX venture, by providing key competences in the areas of real-time embedded computing systems, telecommunications, hypervisors and virtualization, and formal verification. Several members of CISTER are actively working on VORTEX in these areas, providing the necessary work-force to establish a first demonstrator targetting cutting-edge, future solutions for the automotive domain.

VORTEX BOOTCAMP IN CISTER

On the 7th and 8th of May, the VORTEX Bootcamp took place at CISTER facilities.
The event's purpose was to bring together and promote cooperative thinking to produce new groundbreaking ideas, which

will ultimately become the core of the next developments that will be addressed by the team of VORTEX, the new Collaborative Laboratory and Acceleration and Technology Transfer Center of Cyber-Physical Systems in Cyber Security.

Around 30 researchers/technicians participated from all the VORTEX members: ALTRAN Portugal; CISTER; NOVALINCS; HASLab/INESC TEC and Beta-i.

VORTEX GENERAL ASSEMBLY

The first VORTEX General Assembly was held at the CISTER Labs on the 8th of May, alongside with VORTEX Bootcamp.
This first General Assembly was mainly to ratify changes in the association bylaws proposed by the supervisory board, to name the members of the assembly and elect members of the VORTEX Scientific Council.

After discussing the overall charter and proposed changes, the assembly approved by unamity those changes.
The General Assembly is thus constituted by Jaime Medeiros - President (Altran/CRALaw); Nuno Correia - Secretary (NOVALINCS/UNL) and Paulo Gandra de Sousa - Secretary (CISTER/ISEP).

CISTER Researchers David Pereira and Ricardo Severino were appointed as members of the VORTEX Scientific Council and Eduardo Tovar was appointed as President of the VORTEX Scientific Council.
After this formality, the assembly members discussed about the future of the association based on the briefing of the bootcamp.

CISTER Quicknews

progress in projects

FINAL EVENT OF THE ENABLE-S3 PROJECT IN GRAZ

CISTER researchers **David Pereira** and **Pedro José Santos** have attended the Final Event of the ENABLE-S3 project, which took place in Graz, Austria, where the most important project results were presented to project partners, the ECSEL JU appointed reviewers, the project officer, guests and visitors.

David and Pedro had the responsibility to present the work of CISTER in the two use cases where the unit was involved over the past three years:
Use Case 4 - Traffic Jam Pilot With V2x Communication, co-led by GMV Skysoft and CISTER;
and Use Case 13 - Autonomous Control Platform, led TTTech and TTControl.

Overall, the meeting and the participation of CISTER was a huge success. The results produced by CISTER made a strong contribution to the framework for the verification and validation of highly automated CPS developed along the three years of duration of ENABLE-S3, and to the outcomes of the two use cases where the unit was involved. Furthermore, collaborations established within the scope of the project will continue with the aim at maturing them and potentially leverage them to the level that they can be included into high-value innovative V&V solutions.

More details about the Final Event and the role of ENABLE-S3 on introducing more advanced methods that aspire to substitute today's cost-intensive verification & validation efforts of highly automated cyber physical systems (ACPS), can be found in the project's webpage.

ANOTHER SUCCESSFUL INDUSTRY-DRIVEN PROJECT DELIVERED

Hosted by our Norwegian partners from SINTEF and Maritime Robotics at the beautiful city of Trondheim in Norway, the final review meeting of the ECSEL project SafeCOP, left an impressing feeling of accomplishment on everyone. Reviewers gave a thumbs up to the work carried out in the project, leaving a quite constructive feedback and an encouraging invitation for a second round of the project in the near future.
During the first day, the consortium presented the final outcome of the six use cases, including a live demonstration of maritime autonomous vessels. During the second day, the technical management team, including CISTER, represented

by **Ricardo Severino**, presented the main conclusions and scientific findings to the reviewers and project officer.
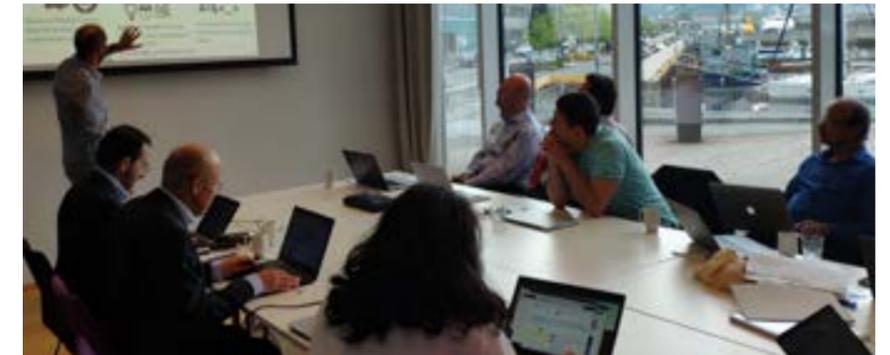SafeCOP is an European project that targets safe and secure wireless cooperation of cyber-physical systems-of-systems. Particularly focusing on guaranteeing safety in the unpredictability of open environments, the technological advancements in the project enabled a series of use-cases that are pushing forward future autonomous wireless cooperative systems in the healthcare, maritime, and automotive sectors.
CISTER heavily contributed to the

project, by leading Work Package 3 and most of its tasks on Safe and Secure Wireless Cooperation for Cyber-Physical Systems, together with a task on Runtime Monitoring for Safety Assurance on Work Package 4, which was dedicated to platform and tool support for safety assurance. Besides this technical work, CISTER played a major role in the developing of a set of tools for the validation and demonstration of several of the project's technology bricks. These tools were part of the effort of the cooperative vehicular platooning use-case which CISTER developed together with GMV Skysoft. Greatly impressing the reviewers, the Portuguese use-case demonstrated, in

a simulation with hardware-in-the-loop components and via a robotic platooning testbed, several vehicle-to-vehicle enabled cooperative components, in particular a Control Loss Warning module, able to detect vehicle platooning errors and trigger a correspondent safety action. The results from this use-case are presented in the video available in youtube.

THERMAC PHYSICAL KICK-OFF MEETING AT CISTER

From May 22 to 24, CISTER hosted the physical kick-off meeting of the European project THERMAC. THERMAC is a Clean Sky 2 H2020 project that targets the development of thermal aware software management solutions for multicore and GPU based computing platforms for the next generation of small aircraft. CISTER leads the project with CISTER's researchers **Eduardo Tovar** and **Geoffrey Nelissen** being the project's Coordinator and Technical

Leader, respectively.
This project attempts to answer a specific problem posed by Honeywell International in the 8th call for proposal of the Clean Sky 2 Joint Undertaking. The project aims at increasing the guaranteed performance of multicore+GPU systems by 30% for an equivalent thermal profile, and at reducing the operational temperature by 20% for an equivalent guaranteed performance level.

The first physical meeting held in CISTER's facilities had the following goals: better understanding the specific constraints of the problem defined by Honeywell;
start identifying a first set of promising solutions to improve the thermal properties of avionics systems;
and study potential processing platforms for the demonstrators that will be developed during the project.

GENERAL ASSEMBLY AND F2F MEETING OF THE PROJECT SCOTT IN GDANSK

Ramiro Robles has attended the General assembly and overall F2F meeting of the project SCOTT in the city of Gdansk, Poland. This was a three full-day meeting on 4- June 2019. This is the first F2F meeting of the final year of the project.

CISTER has a fundamental participation in the project as representative of the aeronautics domain, leader of the technology line of reference architecture, active contributor to standardization, regulation and certification, and as the chair of the technical board. This F2F meting has a strong impact management component with demonstrator sessions, dissemination, paper presentation, and Hackathon competitions.

CISTER will be involved in several activities regarding the introduction of trust in the reference architecture of the project. The objective is that SCOTT will provide a new vision of trusted system development for IoT industrial applications.

REASSURE PROGRESS MEETING AT U.MINHO

On the 11th of June, CISTER Researchers **David Pereira** and **Giann Nandi** have participated in a progress meeting of REASSURE, that took place in the premises of the Department of Informatics of University of Minho.

The meeting, which counted also with the participation of REASSURE's team members José Bacelar Almeida and Jorge Sousa Pinto from HASLab/ INESC TEC, had the purpose of analyzing the results obtained by both teams in this first year of REASSURE, and to plan the next steps for the second year of activities of the project, notably in what concerns the design of Domain Specific Languages and Cyber-Security Support in the design of runtime monitoring architectures.

Particular focus on the work developed by **Giann**, under his PhD studies, on the formal verification of WSN protocols using the ProVerif Tool, which is the core result described in the paper entitled "Security in Wireless Sensor Networks: A formal verification of protocols" that has been recently accepted in this year's edition of INDIN 2019 – 17th IEEE International Conference on Industrial Informatics.

fundamental research activities

OPEN DEBATE SESSION ABOUT "PLASTICOLOGY" AT PORTO DESIGN FACTORY

On April 23th, CISTER Researcher **Pedro M. Santos** participated in the In Session about "Plasticology" organized by the Porto Design Factory.

Some of the addressed topics were the relevance of plastic-based products in our society and their impact in the environment. A core idea that was discussed was that of promoting among the general public, that often regards plastic as discardable, the concept of a circular usage of plastic-based products, i.e., involving its reuse and recycling.

The industrial representative - Ernesto São Simão (plastic moulding) - is a strong supporter of this approach, actually letting us know that, for some products, using recycled plastic in product manufacturing is perfectly acceptable and lowers the production cost with respect to using new raw material.

Information technologies such as those explored by CISTER can play an important role in the traceability of plastic products, e.g., for keeping information on the source and quality of the recycled plastic.

A MACHINE LEARNING CHALLENGE WAS WON BY CISTER INTERNS

The last INESC-TEC Telecommunications and Multimedia Center Open (TMC) day brought together several higher education students into a set of workshops in the fields of computer networking, optical and electronic, data processing and multimedia.

Two CISTER interns and undergraduate students in Computer Engineering, **Rita Sousa** and **Tiago Coelho**, participated in the workshop "Machine Learning & Computer Vision" and won the final challenge.

"Each group was given a set of images from Simpson's family comic strip and the challenge was to identify which of the characters was present in each of these images, using artificial intelligence techniques.

By having 30 minutes, and starting from an initial solution, each participant should adapt the Machine Learning model so as to maximise the number of characters correctly identified" - explains Luís Vilaça, INESC-TEC Researcher and Electronic/Computer Engineering MSc student.

To Rita and Tiago, to represent CISTER/ISEP in this competition lead to an increased of sense responsibility and motivation to their current work at CISTER.

"To compete with other schools is much more appealing. We have no knowledge of their techniques and preparation for the challenge. Having achieved the first place left us very satisfied, not only on a personal level, but we proved that CISTER/ISEP successfully prepares their students to tackle new challenges, and therefore, upheld its reputation."

HDR EXAMINATION OF LUCA SANTINELLI

Last 20th of May, at the ENSEEIHT in Toulouse, CISTER Vice-Director **Luis Almeida** participated in the HDR examination (Habilitation à Diriger de Recherche) of Luca Santinelli, a well-known member of the real-time systems community, based at ONERA, working essentially on probabilistic methods for the estimation of the worst-case execution and response times.

The examination focused on the research path of the candidate and his research perspectives for the future.

Beyond **Luis Almeida**, the examination committee included Alan Burns U.York,UK; Isabelle Puaut, U.Rennes, FR; Laurent George, ECE, FR; Yves Sorel, INRIA, FR; Joel Goossens, ULB, BE and Christian Fraboul, U.Toulouse, FR.

CISTER Quicknews

VISIT FROM SERBIAN RESEARCHER OF THE RT-RK NATIONAL RESEARCH INSTITUTE

Nives Kaprocki, assistant professor and PhD student of the Faculty of Technical Sciences of Novi Sad, Serbia, visited CISTER while on a mobility scholarship of the Erasmus+ programme.

She is also a researcher at the RT-RK National Research Institute, specializing in Deep Learning and Autonomous Systems and in its application to the automotive sector. Such research interests are greatly aligned with some of the research frameworks CISTER has been pushing forward, and therefore, not surprisingly this short visit resulted in several and quite fruitful technical discussion with CISTER's cooperative autonomous systems research team, which has been developing relevant tools and simulation frameworks in the topic.

Very much interested in the research/industry synergetic model pursued at CISTER-Labs, **Nives**, got the opportunity to see several demonstrations of two industry-driven projects which have recently finished - SafeCOP and ENABLE-S3. Several potentially interesting cooperation opportunities will be followed in the next months with RT-TK.

THE INTERACTION-CENTRIC PARADIGM

José Proença, a new Ph.D. member of CISTER, gave a talk on **"The Interaction-Centric Paradigm"**, providing insights on a paradigm that regards interactions as first-class mathematical objects, expressed as relations that constrain communication ports of cooperating processes.

José presented the Reo coordination model - a formal domain-specific language for this interaction-based paradigm, used for programming concurrency protocols. **José's** work has been mainly on coordination of distributed components, often associated to the Reo coordination language, and on formal approaches to software product line engineering. More recently he has been working with binding and component models for embedded devices in the context of the LooCI middleware and micro PnP (now part of VersaSense), on in the context of time-sensitive connectors, and in the context of the VirtuosoNext RTOS.

José is now leading the FCT project DaVinci on distributed architectures of Cyber-Physical Systems.

CISTER Quicknews

Tomás Corrêa
Universidad de Alcalá de Henares, Spain

Walter Tiberti
University of L'Aquila, Italy

DIGITAL COMMS FOR THE CONTROL OF MODULAR MULTILEVEL CONVERTERS

Tomás Corrêa gave a talk on "Digital Communications for the Control of Modular Multilevel Converters" on the 19th of March, at CISTER/FEUP. Tomás is a PhD student at the Universidad de Alcalá de Henares in Spain and started by explaining the concept of Modular Multilevel Converter (MMC) and how it impacted the conversion and control of electrical energy at high voltage levels.

MMCs, invented in 2001, are composed of a potentially large number of power modules, as known as cells, that are stacked and switched on and off individually to generate a voltage wave with a desired shape, typically sinusoidal.

The cells are controlled centrally but individual connections to the controller can limit scalability and hinder MMCs applicability.

Thus, Tomas focused on the current trend toward using digital communications in MMCs and told us about the benefits and challenges this trend implies, particularly concerning the trade-off between latency, reliability and cost. Among different alternatives, Ethernet technology connected in a ring topology stands up, currently, as the best compromise essentially due to the high reliability-cost ratio and despite the relatively high latency it implies.

Tomas shared with us, then, his research on Ethernet-based ring networks to bring latency to a minimum, designing specific protocols, namely TTRing and DiSortNet, for specific distributions of the MMC control, that reduce by one half the best latency achievable with current COTS technology, supporting 400 nodes with cycle times below 200us.

SECURITY IN EMBEDDED SYSTEMS

Walter Tiberti, a visiting Ph.D. student from the University of L'Aquila (Italy) gave a talk on **"Security in Embedded Systems: the Wireless Sensor Networks case"**.

After a quick overview on security in general-purpose platforms and in the Embedded System domain, he presented some state-of-the-art cryptographic solutions for securing a particular class of Embedded Systems: the Wireless Sensor Networks (WSN). He introduced the "Topology Authenticated Key Scheme" (TAKS), an lightweight hybrid-cryptography scheme for Wireless Sensor Networks.

Walter works on Embedded Systems security as well as malware analysis, penetration testing, reverse-engineering, low-level software design and development (e.g. drivers, firmwares, etc.) and digital hardware design for reconfigurable platforms. He has been involved in European projects such as ERC VISION (2009) and he is currently working in the ECSEL SafeCOP project - Safe Cooperating Cyber-Physical Systems using Wireless Communication - in which CISTER is also a partner and is leading work-package on Wireless Sensor Networks.

CISTER - Research Centre in Real-Time & Embedded Computing Systems

isep Instituto Superior de Engenharia do Porto

P.PORTO

FCT Fundação para a Ciência e a Tecnologia

CISTER Quicknews

THERMAL-AWARE SCHEDULING

Javier Pérez Rodríguez gave a talk on **"Single-Core Thermal-Aware Scheduling"**.

During the talk, he addressed the scheduling problem of non-preemptive periodic tasks on a single processor platform under thermal-aware design.

As a matter of fact, technology advances in microprocessor design have resulted in high device density and performance during the last decades. More components are fabricated on the chip die and millions, if not billions, of instructions can now be executed within microseconds. A consequence of this advancement is heat dissipation by the microprocessors.

In this context, elevated on-chip temperature issues have become an important subject for the design of future generations of microprocessors, especially in avionics and automotive industries.

After a brief overview of the thermal models for single-core platforms available in the literature, **Javier** presented two new thermal-aware scheduling strategies, referred to as NP-HBC and NP-CBH, to keep the system temperature within specified parameters and derived their respective schedulability analysis.

Javier is currently a PhD student member at CISTER and is involved in the THERMAC project (Thermal-aware Resource Management for Modern Computing Platforms in the Next Generation of Aircraft), developed in collaboration with Honeywell.

EFFECTIVE SYSTEM INTEGRATION

Laerte Oliveira, a visiting researcher from the Technological Institute of Aeronautics (ITA) in Brazil, gave a talk on "Effective System Integration". After highlighting the importance of the integration stage in the development process of complex systems, Laerte presented a solution for typical problems encountered in this stage. Specifically, he suggested the improvement of the planning stage by proposing a twelve-topic methodology.

In this scope, SIVOR, an aircraft simulator developed at Embraer and partitioned into several sub-systems (motion, cockpit, visual and supervisory), was used as use-case to demonstrate the effectiveness and advantages of the proposed approach. **Laerte** presented relevant aspects of the work he conducted during his stay at CISTER. Notably, he provided insights of his contribution in the FLEGIXY project and the VORTEX CoLab.

Laerte was a System Engineer and Technical Manager at Embraer for 35 years. He received a B.S. degree in Electronic Engineering in 1980 and a M.S. degree in Mechanical Engineering in 2017, both from the Aeronautical Technology Institute – ITA, Brazil.

His experience involves the airplanes' complete development cycle and his research interests include, but is not limited to: Systems Engineering processes and applications, Avionics integration, and Model Based Development Engineering.

MODEL-DRIVEN ENGINEERING

Marco Aurélio Wehrmeister, Professor at the Federal University of Paraná (Brazil), gave a distinguished seminar on **"Applying Model-Driven Engineering in the co-design of Real-Time Embedded Systems"**, where he presented methods and techniques applied in the co-design of real-time embedded systems, specifically those that are implemented as a System-on-Chip (SoC) and include components with reconfigurable logic (FPGA).

Specifically, he introduced model-driven engineering (MDE) techniques combined with separation of concerns in the handling of functional and non-functional requirements. Results indicate that the abstraction increase obtained by using the proposed framework leads to an improvement in the reuse and adaptation of software components.

Marco Aurélio is current chair of the special commission on Computing Systems Engineering of the Brazilian Computer Society and also member and vice-chair of the IFIP Working Group 10.2 on Embedded Systems.

COMMUNICATIONS FOR SATELLITES

Last 18th of June, **William Edmonson** gave a distinguished seminar on **"Communications for Satellites (within clusters) and System Design"** at CISTER.

In this talk he provided an overview of the Small Satellite Systems Research Center that he leads and its activities towards advancing the capabilities, functionality, and scope of mission for small satellites so they can operate reliably and autonomously for earth observations or deep-space missions. More specifically, he introduced two research lines, namely using model-based systems engineering (MBSE) for verifiable correct-through-construction design, and inter-satellite communication using visible light. This inspirational talk, available at CISTER's youtube channel, ended with an informal discussion in which we identified several synergies with the research at CISTER both in the formal methods domain and in the synchronization of communications and data sharing mechanisms.

William Edmonson is a Professor at the Department of Electrical and Computer Engineering at the North Carolina A&T State University (USA) where he leads the Small Satellite Systems Research Center.

The visit to Porto, Portugal took place in the context of a Fulbright scholarship.

WFCS 2020

16th IEEE International Conference on Factory Communication Systems

Porto, Portugal

27-29, Apr, 2020

Topics of Interest

- Real-time Communication Systems and Technologies
- Cyber-Physical Systems
- Networked Embedded Systems
- Safety and Security of real-time Networks
- Communication Technologies for Industry 4.0
- Green Communication in Industry
- Recent advances in research domains with similar communication requirements

Important Dates

Submission Deadline	12 January 2020
Notification	2 March 2020
Final versions deadline	13 March 2020
WiP submission deadline	6 March 2020
WiP notification	17 March 2020
WiP final versions deadline	20 March 2020
Early registration deadline	27 March 2020

www.cister-labs.pt/wfcs2020/

Organizing Comittee

General Co-Chairs:
Luis Almeida, Univ. Porto-CISTER-Portugal
Ramez Daoud, SEAD Group-AUC Egypt

Technical Program Co-Chairs:
Ahlem Mifdaoui, ISAE-France
Frank Golatowski, Univ. of Rostock-Germany

Treasurer:
Mario Sousa, Univ. Porto-CISTER-Portugal

Information Chair:
Filipe Pacheco, ISEP-CISTER-Portugal

Publication Co-Chairs:
Hassanein Amer, AUC-Egypt
Pedro Santos, ISEP-CISTER-Portugal

Publicity Co-Chairs:
Magdi El-Soudani, Cairo University-Egypt
Luis Pinto, Univ. Porto-CISTER-Portugal

WIP Co-Chairs:
Hany El-Sayed, Cairo University-Egypt
Pedro Souto, Univ. Porto-CISTER-Portugal

Special Sessions Co-Chairs:
Ihab Adly, Tegrom-Egypt
Ricardo Severino, ISEP-CISTER-Portugal

Technical Program Committee:
Mohammad Ashjaei, Mälardalen Univ-Sweden
Marc Boyer, ONERA-France
Gianluca Cena, CNR-Italy
Liliana Cucu, INRIA-France
Pieter J.L. Cuijpers, TU/e-Netherlands
Marco Di Natale, SSSUP-Italy
Joaquim Ferreira, Univ. Aveiro-Portugal
Luis Ferreira, ISEP Porto-Portugal
Mikael Gidlund, Mid Sweden Univ-Sweden
Svetlana Girs, Mälardalen Univ-Sweden
Hassan Halawa, UBC-Canada
Sahar Hamed, Canadian Int College-Egypt
Mathieu Jan, CEA-France
Juergen Jasperneite, OWL-Germany
Ran Jin, Virgina Tech-USA
Wolfgang Kastner, TU Vienna-Austria
Lucia Lo Bello, Univ Catania-Italy
Martina Maggio, Lund University-Sweden
Julio Medina, Univ Cantabria-Spain
Nicolas Navet, Univ Luxembourg-Luxembourg
Borislav Nikolic, IDA/TU Braunschweig-Germany
Berna Ors, Istanbul Tech Univ-Turkey
Gerhard P. Hancke, Univ Hong Kong-Hong Kong
Roberto Passerone, Univ Trento-Italy
Gaetano Patti, Univ Catania-Italy
Paulo Pedreiras, Univ Aveiro-Portugal
Luis Miguel Pinho, ISEP Porto-Portugal
Paul Pop, TU Denmark-Denmark

Paulo Portugal, Univ Porto-Portugal
Julian Proenza Arenas, Univ Balearic Isl-Spain
Isabelle Puaut, Inria Rennes-France
Markus Rentschler, Balluff-Germany
Frédéric Ridouard, Univ Poitiers/ENSMA-France
Matthias Riedl, ifak-Germany
Christine Rochange, irit-France
Ricardo Rodriguez, Univ Zaragoza-Spain
Selma Saidi, TU Hamburg-Germany
Luca Santinelli, Airbus Defense&Space-Germany
Thilo Sauter, Danube University-Austria
Jean-Luc Scharbarg, IRIT-France
Lucia Seno, CNR-Italy
Ramon Serra Oliver, TTTech-Austria
Michael Short, Teesside University-UK
Frank Singhoff, Univ Brest-France
Emiliano Sisinni, Univ Bresci-Italy
Samy Soliman, Univ Science&Tech Zewail-Egypt
Ye-Qiong Song, Loria-France
Iñaki Val, IKERLAN-Spain
Holger Voos, Univ Luxembourg-Luxembourg
Quansi Wen, South China Tech Univ-China
Lukasz Wisniewski, OWL-Germany
Martin Wollschlaeger, TU Dresden-Germany
Patrick Yomsi, ISEP Porto-Portugal

Sponsors

IEEE · IES · IEEE-IES Technical Committee on Factory Automation · CISTER - Research Centre in Real-Time & Embedded Computing Systems · U. PORTO FEUP FACULDADE DE ENGENHARIA UNIVERSIDADE DO PORTO · isep Instituto Superior de Engenharia do Porto · THE AMERICAN UNIVERSITY IN CAIRO