

## ACM SIGBED MEETING IN VIENNA

## ACTIVITIES IN THE CENTER

and the Embedded Systems Week (ESWeek, also an annual event typically taking place in October).

The ACM SIGBED oversees a number of technical, scientific and professional activities. Two of the most important events organised by ACM SIGBED are precisely the CPSWeek (an annual event typically taking place in April) and the Embedded Systems Week (ESWeek, also an annual event typically taking place in October).

During the CPSWeek last April in Vienna, the ACM SIGBED plenary meeting took place under the leadership of the current three SIGBED officers: Insup Lee (Chair); CISTER's Eduardo Tovar (Vice-chair) and Oleg Sokolsky (Secretary/Treasurer).

The CPSWeek 2016 had an all-time record of over 700 participants divided by the 4 main conferences and more than 15 workshops and tutorials. The next ACM SIGBED plenary meeting is planned to take place during the ESWeek 2016, in Pittsburgh, PA, USA, where the event is being organised by CMU colleagues.

## CISTER hosted two distinguished seminars

In April, CISTER received the visit of two experts, with the goal of furthering its scientific internationalization and collaborations: Daniel Gracia Perez from THALES, France and Shinpei Kato from Nagoya University, Japan.



Daniel Gracia Pérez is a Research Engineer at THALES, France, with focus on the development and application of new multi-core architectures to safety-critical systems. Daniel delivered a distinguished seminar series lecture on "Deterministic Platform Software for Hard Real-Time Systems using Multi-Core COTS". During his talk, he proposed an overview of existing Deterministic Platform Software (DPS) solutions to fundamental issues related to the integration of COTS processors in future generations of avionic equipment as well as a criteria leading to a uniform classification.



Shinpei Kato is an Associate Professor at Nagoya University, Japan. He is a co-director of Embedded Real-Time Systems Laboratory (ERTL) and Parallel and Distributed Systems Laboratory (PDSL) at Nagoya's University Department of Information Engineering. During his visit, Shinpei Kato delivered a distinguished seminar series lecture on "How to build an autonomous vehicle from scratch".

During the the talk, he presented an approach to building an autonomous vehicle using open-source software and hacking vehicles.

## TWO INTERNATIONAL PHD STUDENTS JOIN CISTER

**Zeeshan Haider and Jibrán Ali are the two most recent PhD students to join CISTER.**



Zeeshan Haider earned his BEng degree in Electronic Engineering at National University of Science and Technology (NUST), Zimbabwe, in 2012, and a MSc in Systems Engineering from Shanghai Jiaotong University (SJTU), China, in 2015. Zeeshan's main research interests are related to Optimization, Control Systems and Smart Grids.

Jibrán Ali received a BEng degree in Electronic Engineering from NED University of Engineering and Technology, Pakistan, in 2012, and a MSc degree in Electrical Power Systems from North Carolina State University (NC State), USA, in 2015. Jibrán's research interests include Smart Grid Systems, SCADA & Communication Protocols, and Encryption.



## PROGRESS IN PROJECTS

## P-SOCRATES

Carlos Moedas, European Commissioner for Research, Science and Innovation, visited Porto this April, invited by the city mayor, Rui Moreira. In these two days the Commissioner toured the city's innovative companies and institutions.

*The commissioner visited the Polytechnic Institute of Porto (P.PORTO) where, in an informal meeting, P.PORTO's researchers presented advancements and achievements in notable international projects led by P.PORTO.*

In this meeting, CISTER researcher Vincent Nélis presented the results of the P-SOCRATES project, an European project led by CISTER, and discussed the project's vision and exploitation opportunities for the foreseeable future.

## Safe Cooperating Cyber-Physical Systems using Wireless Communication



CISTER researchers Ricardo Severino and Eduardo Tovar participated in the kick-off meeting of this recently approved ECSEL project.

SafeCOP addresses safety-related cooperating cyber-physical systems, characterized by use of wireless communication, multiple stakeholders,

dynamic system definitions and unpredictable operating environments.

CISTER is leading the work package related to safe and secure wireless cooperation for Cyber-Physical Systems. This package will evaluate the adequacy of COTS and standard

wireless technologies, and extend current wireless protocols for safe and secure cooperation. In this project, CISTER will also be involved in a vehicle platooning use case. SafeCOP partners include Thales, SINTEF, KTH, SICS and and key national industrial players such as GMV Skysoft and Tekever.



CISTER has successfully participated in the submission of 6 project proposals for the recent H2020 calls ICT-01-2016 (Smart Cyber-Physical Systems) and FETPROACT-01-2016 (FET Proactive: emerging themes and communities, disruptive information technologies). The first call targets the challenge of designing and implementing highly distributed and connected digital technologies embedded in increasingly Smart Cyber Physical Systems. The latter call targets new directions of knowledge and skills, fostering the emergence of new technologies.

CISTER participation in these highly competitive calls is a great achievement with credits to all CISTER members. One of the proposals is led by CISTER, being the unit work package leader in 4 other proposals. Altogether, the proposals consider a total effort of 498 PMs and a requested budget of about 2.7 M Euros. Technically, the proposals cover various CPS-related topics including parallel computing, timing analysis (static and probabilistic), runtime monitoring and verification, and middlewares. Proposals consortium's include companies such as Airbus IG, Bosch, GMV, IBM, Intecs, Softeam, Thales, and reputed research centers and universities such as Barcelona Supercomputing Centre, Fortiss, Ikerlan, Inria, and UPC.

## ACHIEVEMENTS IN ACADEMIA MULTIFACETED PARTICIPATION AT CPS WEEK 2016

CPS week, the top event on Cyber-Physical Systems (CPS) bringing together four leading conferences, three summits, six tutorials, twenty one workshops, and various exhibitions from both industry and academia was held in Vienna, in April. The four conferences are the International Conference on Information Processing in Sensor Networks (IPSN'16), the International Conference on Hybrid Systems (HSCC'16), the International Conference on Cyber-Physical Systems (ICCPs'16), and the Real-Time and Embedded Technology and Applications Symposium (RTAS'16).

CISTER researcher Eduardo Tovar was Program Co-chair of the 7th ACM/IEEE ICCPS, which is the leading single-track conference for

reporting advances in all aspects of cyber-physical systems. ICCPS 2016 was the conference receiving the highest number of participants (around 150) out of all 4 conferences co-located in the CPSWeek, and offered a very exciting technical programme on cutting edge advances in CPS research and technology being performed by the top research groups in the world. Notably, many of the research works presented at ICCPS were receiving a huge attraction from the international media, including the Newsweek Magazine.

Researchers from CISTER participated as the workshop chair in RTAS'16, and also served as members of the technical program committee of RTAS'16 and member of the jury for the best

presentation award of RTAS'16. RTAS is one of the top-impact Real-Time conferences, with a steady involvement of numerous CISTER researchers over the years in various roles. In particular, Vincent Nélis served as RTAS'16 WiP chair, and Benny Åkesson and Borislav Nikolić served as members of the WiP Program Committee. Two CISTER PhD graduates, Dakshina Dasari (now with Bosch, India) and Gurulingesh Raravi (now with Xerox, India) also served on this board.

During the RTAS'16 Demo session, CISTER introduced a new run-time monitoring technology developed within the CONCERTO project, and posters introducing some work in progress innovative and original ideas were also presented.

## ANOTHER SUCCESSFUL PHD DEFENSE

Kostiantyn Berezovskyi has successfully defended his PhD thesis at the Faculty of Engineering of University of Porto, Portugal. The thesis, entitled "Timing Analysis of General-Purpose Graphics Processing Units for Real-Time Systems: Models and Analyses", under the supervision of CISTER researcher Konstantinos Bletsas, proposes 3 timing analysis approaches: optimization-based, metaheuristic-based and measurement-based.



The corresponding results were published in top-ranked real-time systems conferences, namely ECRTS2012, ETFA2013, RTNS2014, in collaboration with researchers, such as Eduardo Tovar (CISTER, Portugal), Luca Santinelli (Onera, France), Björn Andersson (SEI/CMU, USA) and Stefan M. Petters (Exida, Germany).

The PhD jury committee was composed of Shinpei Kato (Nagoya University, Japan), Christine Rochange (Université Paul Sabatier, France), Eduardo Tovar (CISTER, Portugal), José Matos (FEUP, Portugal), Pedro Souto (FEUP, Portugal), João Ferreira (FEUP, Portugal), and Konstantinos Bletsas (CISTER, Portugal).

## Review meeting of

The second year review meeting of the DEWI project recently took place in Brussels and was preceded by a rehearsal day in the premises of ARTEMIS/ECSEL headquarters.

CISTER researcher Ramiro Robles represented the center in both these events. This year the focus of the review was on demonstrations of all the prototype developments and technical progress of 21 use cases.

CISTER leads multiple activities in DEWI including, aeronautics domain, work-package on active flow control use case, high level architecture activities, and the standardization, certification, and regulation work-package. The preliminary outcome of the review meeting was very positive with further progress anticipated during the third and final year of the project.

## ECSEL/ARTEMIS-IA SPRING EVENT

The ARTEMIS spring event was co-located with the CPS week in Vienna.

**ARTEMIS/ECSEL is an important avenue for conducting pan-European research with immense potential towards generating IP in industrial domains, a strong focus and strength of Europe.**

During the event the Strategic research agenda was released and discussed.

Nearly 150 participants came together to also learn about and discuss highlights of Cyber-Physical Systems projects from Horizon2020 and ARTEMIS. ECSEL projects with CISTER involvement, Arrowhead and MANTIS, were also presented. CISTER researchers Raghuraman Rangarajan and Eduardo Tovar participated in this event.



## CISTER-led HiPEAC CSW thematic session

CISTER researcher Luis Miguel Pinho organized and coordinated a thematic session during the HiPEAC Computing Systems Week held in Porto at the Science and Technology Park of University of Porto (UPTEC). The session was on "Time, energy and other resources analysis for predictable parallel programming of cyber-physical systems". The event was jointly organized by the TACLE COST Action (IC1202 Timing Analysis on Code-Level) and the

P-SOCRATES FP7 project. There were two technical presentations, one from Daniel Gracia Perez (Thales, France) and another from CISTER researcher Vincent Nélis (CISTER, Portugal). In addition, Clemens Grelck (University of Amsterdam, The Netherlands) gave a presentation about a new COST Action proposal, to be submitted later in 2016. CISTER researchers Konstantinos Bletsas and Luis Miguel Pinho (the latter as the designated chair) have a central role in the preparation of this proposal, which aims to build a new community around the analysis of systems with respect to their resource requirements (time, energy, platform) and the associated trade-offs.

## VISIT TO CISTER BY THE DEAN OF THE FACULTY OF CREATIVE INDUSTRIES



Prof. Álvaro Barbosa, Associate Professor and Dean of the Faculty of Creative Industries at the University of Saint Joseph (USJ), Macao, visited CISTER as part of his tour to some R&D centers and units of the Polytechnic of Porto (P.PORTO).

During the visit, along with Prof. Clara Sarmento from the Center of Intercultural Studies of the Porto Accounting and Business School (ISCAP), he

acquainted himself with CISTER's CiTech unit and the cutting-edge research in real time embedded systems with industry-driven projects. In addition, several key topics of common interest were identified for future collaborations between the Faculty of Creative Industries and CISTER.