CISTER Quicknews

JANUARY - MARCH ISSUE, 2019

NEW LONGER-TERM CONTRACTS WITH RESEARCHERS

CISTER has completed recently the process to start 9 new 6-year contracts and a new tenured-track position under the Stimulus Program for Scientific Employment in Portugal. After the international call, the contracts will be signed not only with several researchers already at CISTER, but also with two researchers from outside the unit.

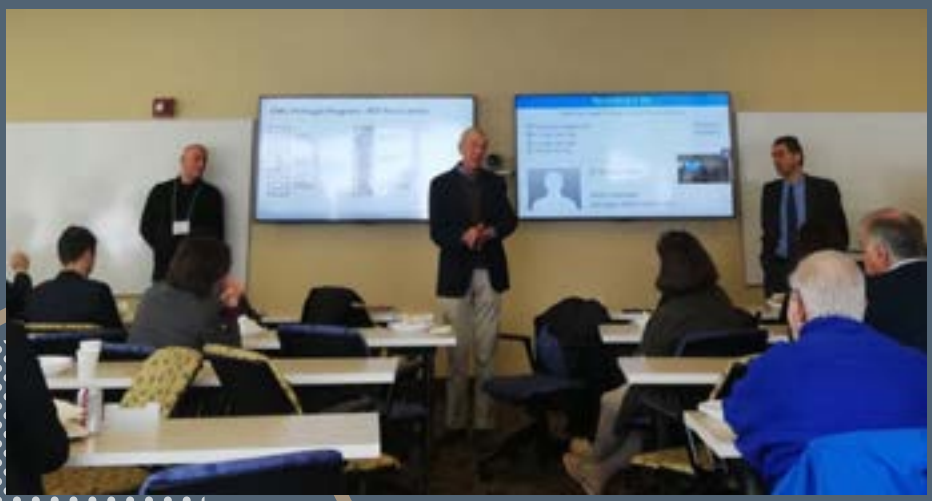
The contracts cover the scientific spectrum from the unit's research from generic **Real-Time Computing Systems**, to specific areas like **IoT**, **Telecommunications and Verification & Validation**.

Most of these positions were focused in fundamental research and build a solid research human resource foundation for the next years.

The Stimulus Program for Scientific Employment national program started with the decree-law DL57/2016 with the objective of fostering scientific and technological employment, promote the rejuvenation of the institutions that make up the National Scientific and Technological System (SCTN), as well as to boost the activities of scientific research, technological development, management and communication of science and technology in these institutions. Specifically, this mechanism promotes new longer-term contracts for doctorates in research institutions (public and private) all over Portugal but due to several delays in the regulation was only applicable in practice in the end of 2018. The program also provides significative financing incentives in certain scenarios.

New positions will also be open by CISTER in the next weeks for more applied research in the several new projects that the unit is involved. These positions will be open for both Senior and Junior researchers. Information about these will be available soon.

CISTER PARTICIPATED IN PORTUGUESE DELEGATION LED BY MINISTER MANUEL HEITOR, AT CARNEGIE MELLON UNIVERSITY



The Minister of Science, Technology and Higher Education, Manuel Heitor, visited on February 1st Carnegie Mellon University (CMU) on an official visit, along with a delegation of 15 people including the Director of CISTER, **Eduardo Tovar**. The visit was focused on strengthening the cooperation in ICT between the Portuguese Government and CMU through the Carnegie Mellon Portugal Program (CMU Portugal), by promoting strategic networking meetings among the Portuguese

delegation and research groups, faculty, and leaders of CMU. The visit was hosted by the Director at CMU of the CMU | Portugal Program José Moura and included discussions with James Garrett, CMU's Provost, and Farnam Jahanian, CMU's President.
Some of the future initiatives were presented such as the launch of new Executive Training Programs, the takeoff of both Faculty and Student exchange programs between Carnegie Mellon and Portuguese universities, and a call for large research projects that will launch soon. This call for projects will be the first launched in Phase III of the CMU|Portugal Program under the Global Science and Technology Partnerships (GoPortugal) initiative. The planned global budget is 18 M€ and will fund collaborative R&D projects between companies, non-corporate entities of the R&D system under the scope of the Portuguese international partnerships, which includes the Carnegie Mellon University (CMU) Portugal partnership. For this call, CMU Portugal projects will focus on the broad ICT area with a focus in Data Science and Engineering; Artificial Intelligence and Machine Learning; Autonomy and Mobility; Cloud Computing; Design in a Variety of Societal Settings and Applications.
The delegation included also the President of Fundação para a Ciência e Tecnologia (FCT), Paulo Ferrão; Carnegie Mellon Portugal Program National Co-Director, Nuno Nunes, representatives from industry (REN and Altice Labs) and from academia (CISTER/ISEP, Universidade do Minho; Instituto Politécnico de Leiria; Instituto Superior Técnico, Universidade Nova de Lisboa, Instituto Politécnico de Bragança).

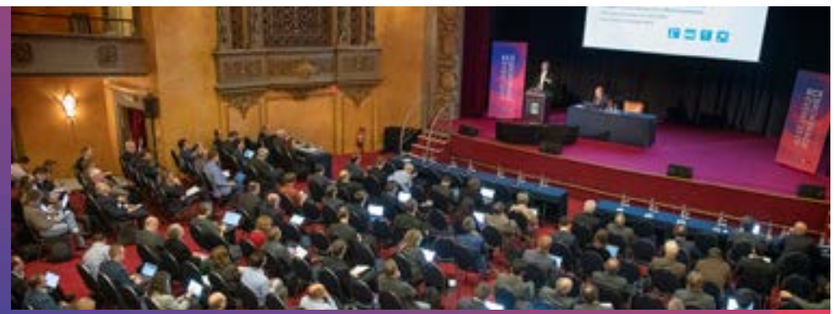
industry collaborations

NEW CPS COLAB MEETING IN LISBON

CISTER Researchers **David Pereira** and **Cláudio Maia** participated on a meeting in the scope of the preparation for the technical activities to be addressed in CoLAB in CPS, the Collaborative Laboratory lead by ALTRAN Portugal.
The meeting took place in the headquarters of NOVALINCS, in Lisbon.
David and **Cláudio** were in the discussions that took place regarding the definition of the technical workplan to be developed in the scope of the CoLab initiative.
CISTER will play a key role on addressing topics related to real-time computing platforms and software.

fundamental research activities

PARTICIPATION ON ECS BROKERAGE EVENT IN BRUSSELS



CISTER Director **Eduardo Tovar** and CISTER Adjunct Director **Luis Lino Ferreira** participated on the ECS Brokerage event 15 & 16 of January.
The ECS Brokerage Event combines the brokerage activities of the industry associations AENEAS, ARTEMIS-IA and EPoSS into one networking event dedicated to project proposals in the field of Electronic Components and Systems.
This event facilitates the ECS communities and collects all project proposals and experts together, making it easier for the ECS research community to find and create information and project proposals.

CISTER Quicknews

JANUARY - MARCH ISSUE, 2019

F2F TECHNICAL BOARD MEETING OF THE PROJECT SCOTT, IN MUNICH

Ramiro Robles represented CISTER/ISEP in the F2F technical board meeting of the project SCOTT held at the premises of our partner NXP in Munich, Germany on the 7th of February 2019.
This meeting was mainly focused on how the different WPs and Technology lines of the project will answer the comments of the reviewers provided in the official feedback after the first year of the project.
In addition, the meeting was also focused on refining the impact and exploitation definition of the project highlighting the main measurable outcomes expected of the project and how we will achieve the target values.
CISTER/ISEP acted as the chair of the technical board, leader of the reference architecture of the project and representative of the aeronautics domain.

FLEXIGY WORKSHOP, IN COIMBRA

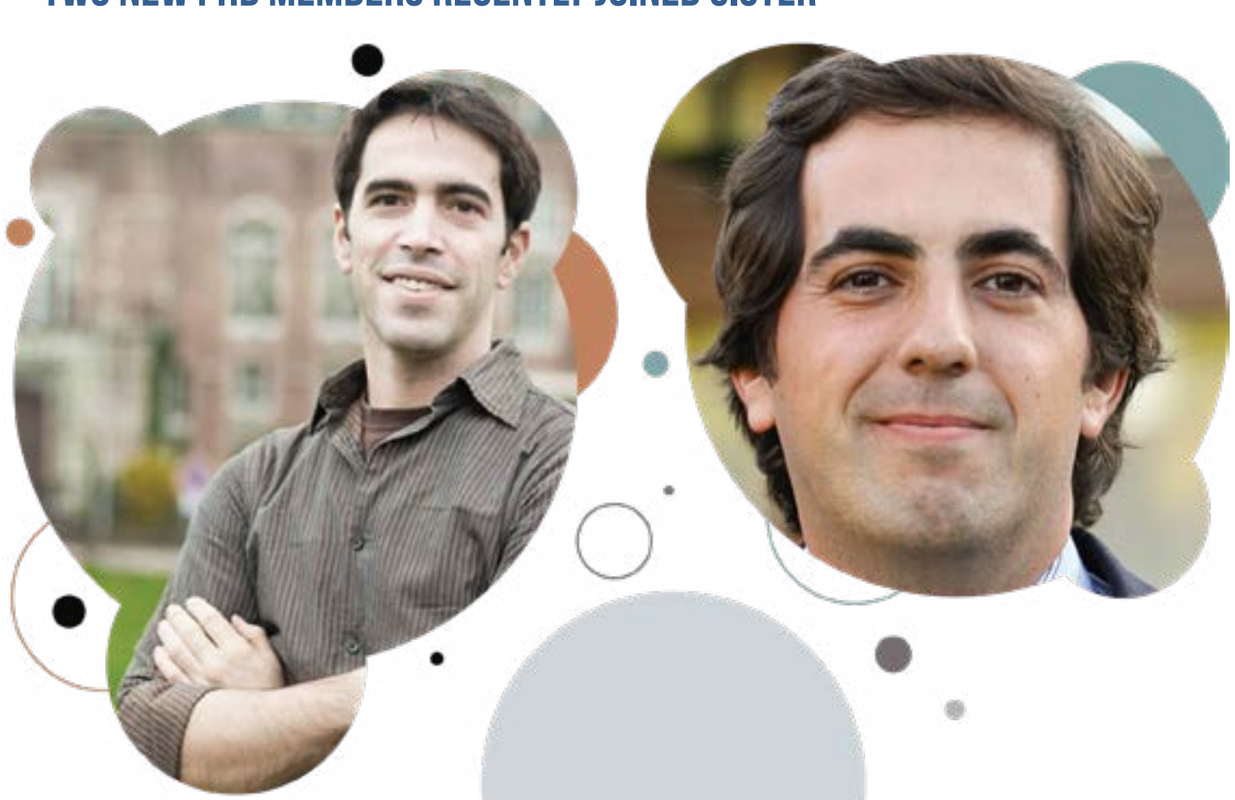
FLEXIGY project aims at creating a Virtual Energy Community concept that will operate "behind the meters" – i.e. the development of flexibility management services to allow energy aggregators to involve energy resources with private bilateral contracts, thus enabling the use of distributed energy resources in a collaborative way, with significantly larger community benefits when compared to individual optimization, supported by a cyber-physical infrastructure required to support load flexibility management with community-wide optimization mechanisms (which includes storage management, production management and load management), thus ensuring the security and satisfaction levels for the economic viability of the proposed solution.
In this project energy transactions will be based on the blockchain concept and virtual currencies, in order to increase trust and end-user engagement.
In this meeting **Luis Lino Ferreira** and **Rafael Rocha** presented their work on the Flex Offer concept and discussed with the other partners the architecture for the system.

SCIENTIFIC COUNCIL MEETING

A CISTER scientific council meeting was held on the 21st of February.
The agenda contained two main topics:
> welcoming of the new CISTER PhD members **Pedro Miguel Santos** and **José Proença. Pedro** and **José** recently joined the CISTER team and will strengthen CISTER's expertise in distributed systems, IoT, vehicular networking and formal methods;
> implementing CISTER's strategy to integrate the large number of new PhD students who continuously join CISTER since last year.

This is a critical point for CISTER as fourteen new PhD students have integrated CISTER's ranks since last year, and new calls for applications will soon be released.

TWO NEW PHD MEMBERS RECENTLY JOINED CISTER



José Proença and Pedro Miguel Santos have now settled and are ready to contribute to a positive impact in the quality of R&D projects developed by CISTER, in cooperation with companies in the area of Real-Time and Embedded Computing Systems.

José Proença is currently working on formal models for component-based systems. Until January 2019 he worked in HASLab, University of Minho, working with Luís Barbosa, and was affiliated with Distrinet, KU Leuven, until January 2016, working mainly with Danny Hughes and Dave Clarke. His 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), and in the context of the VirtuosoNext RTOS. Before he graduated in University of Minho, Portugal, for a 5 year degree in Mathematics and Computer Science. He studied abroad for 6 months as an Erasmus student in Bristol University, UK. He defended his PhD in Leiden University in May 2011, for his work carried in CWI, Amsterdam, in the group for Foundations of Software Engineering.

Pedro Miguel Santos is currently holding positions as assistant researcher at CISTER and as invited assistant lecturer at the University of Porto. He received his B.Sc. and M.Sc. degrees in Electrical and Computer Engineering from the University of Porto in 2009, and the Ph.D. in 2017 in the same field and institution, in collaboration with the Instituto de Telecomunicações. Pedro has been a Ph.D student and post-doctoral researcher in numerous national (P2020), European (FP7) and international projects (CMU|Portugal program), and a visitor to the Carnegie Mellon University for three months (through the CMU|PT Vital Responder project). Pedro is a reviewer for a number of forums on communications and networking (IEEE TWC, VNC, VTC, among others) and served or serves as TPC member for IEEE VNC, WCFS and EAI Future5V. His research interests are in wireless propagation, vehicular networking, and Internet-of-Things for smart cities.

CISTER Quicknews

JANUARY - MARCH ISSUE, 2019

FOUR NEW PHD STUDENTS

During the last month four new PhD students joined CISTER.

Hajar and **Amir** from Iran, **Ênio** from Brasil and **Jingjing** from China, are already aiming their brain power at the next three years, in which they will be doing research in topics such as reliable 5G communications, cooperative autonomous control, and multiprocessor platforms for embedded safety critical systems.

Hajar Baghcheband was born in Shiraz, Iran. She received the B.Sc. in computer software engineering from IAU of Shiraz and the M.Sc. degrees in the field of Information Technology from Graduate University of Advanced Technology (GUAT). Her master thesis was granted by Iran Telecommunications Research Center (ITRC) and focused on applying data mining techniques to intrusion detection system. Since 2009, she was lecturer at higher education institutes and colleges of Shiraz.

In 2016, her new role in company as project management and database administrator started which their project shortlisted for World Summit Award.

Since September 2018, Hajar started to pursue her education toward PhD in Computer Engineering at the Faculty of Engineering of the University of Porto. Her research interests are Machine Learning, Multi agent System, Artificial Intelligence, Data mining, Business Intelligence, Decision Support system and Database.

Amir Hossein Farzamiyan was born in Shiraz, Iran, in 1985. He received both the B.Sc. and the M.Sc. degrees in the field of Electrical and Electronic engineering. He is a graduate with strong communication and organizational skills gained in his study, research and work experience in communication networks and Wireless Communication, now seeking to pursue his study toward PhD in the field of telecommunication.

His research interests are Wireless (Radio) Access Networks, 5G Networks, Internet of Things, Software Defined Network, Advanced Wireless Communications, Cyber-Security, Network Packet Routing Protocol, Network Topology.

Ênio Filho was born in 1984 in Brazil. He has a BSc degree in Automation and Control (2006) and a MSc degree in Mechatronics Systems (2012) both from Universidade de Brásilia (UnB). He is an assistant professor at Instituto Federal de Goiás (IFG), in Brazil. He is pursuing a PhD in Electrical and Computer Engineering at the Faculty of Engineering of the University of Porto (PDEEC).His biggests interests are in autonomous vehicles, communication networks and artificial intelligence in real time applications.

Jingjing Zheng was born in 1991 in Hubei, China.

From a very young age he showed enormously passionate about computers and mathematics.

During his college years, he participated in China Undergraduate Mathematical Contest in Modeling three times, and obtained the Second Prize in Jiangxi Province, the First Prize in Jiangxi Province, the Second Prize in the Nation, respectively.

In 2015 he began to study Control Science and Engineering at the Guangdong University of Technology, where he had done the master thesis of Research on Resource Allocation and Multi-agent Co-optimization for Dynamic Heterogeneous Multi-core Processors, and having obtained a good result through peer reviews. After, he received the M.S.degree from Guangdong University of Technology, China, in June 2018.

Currently his research interests are in Real Time Embedded Systems, Multi-core processors and Optimization Algorithm.

SEMINAR ON "ANALYSIS, DESIGN, AND CONTROL OF PREDICTABLE INTERCONNECTED SYSTEMS"

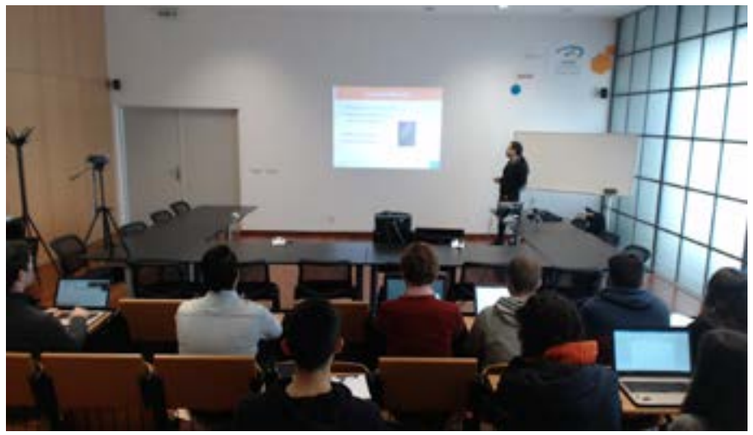
CISTER Researchers **Geoffrey Nelissen** and **Luis Almeida** attended the Dagstuhl seminar number 19101, in Germany.
Dagstuhl seminars are one week seminars treating of a specific topic on computer sciences. It aims at exchanging knowlwedge and bootstrap new researches and collaborations between experts of different fields.
Participation to the seminar is on invitation and the number of attendees is typically limited to 35 to 45 people.
The seminar number 19101 was titled "Analysis, Design, and Control of Predictable Interconnected Systems". It gathered experts from the real-time systems, networks and data flows communities. The seminar was considered a success as it started several interesting discussions on new research directions.

JUNIOR RESEARCHER: TALK A BIT 2019

CISTER Junior Researcher and MSc student **Rafael Rocha** was the Editorial Committee Chair of Talk A Bit, the 7th Edition of the Student Organized Tech Conference in Porto.
Talk a Bit is a non-profit tech conference, focused on the future of technology.
It is organized by graduating Software Engineering students from the Faculty of Engineering of the University of Porto (FEUP).
It has grown from 150 students to more than 500 students, in this year edition, with recognized levels of organizational quality.
There were several talks, including industrialists, from Critical Techworks, Parity Technologies , Xpand-IT and Green Software Lab.

TRAINING ON "INTRODUCTION TO REAL-TIME SYSTEMS" AT CISTER

PhD Researcher **Cláudio Maia**, organised an event integrated in the CISTER training strategy for undergrad students entitled "Introduction to Real-time Systems".
The goal of the event was to convey the students the underpinnings of real-time systems theory in order to better integrate them in the several on-going activities being carried out in the laboratory.
During the event, several topics were covered, including task scheduling and schedulability analysis for uniprocessors.



CISTER Quicknews

JANUARY - MARCH ISSUE, 2019

VEHICULAR NETWORKING AND URBAN SENSING PLATFORMS

Pedro M. Santos, a new Ph.D. member of CISTER, gave a talk on "Bridging the Vehicular and Urban Internet-of-Things" addressing various works on the topics of vehicular networking, urban sensing platforms, and how these two worlds meet. Pedro started by reporting recent efforts to integrate Vulnerable Road Users (VRUs; e.g., pedestrians, bicycles, scooters) in the vehicular networking ecosystem, discussing specifically propagation modelling, link characterization and user applications for bicycle-to-X links.
Moving on to the topic of urban IoT platforms, he shared his contribution to a pioneering deployment of an IoT-supported sensor platform in the city of Porto, and described challenges faced, mechanisms and KPIs developed to operate it, and insightful conclusions drawn from extensive analysis of the collected data. Finally, Pedro reported a characterization of infrastructure-to-vehicle (I2V) links in an urban scenario and subsequent extension to I2V service estimation, and showcased a delay-tolerant strategy to collect the sensor data.

FORMAL VERIFICATION OF CRYPTOGRAPHIC PROTOCOLS

CISTER PhD student **Giann Nandi** gave a talk on the topic of "Formally Verifying Cryptographic Protocols Using ProVerif".
ProVerif is an automatic verifier based on the formal model called Dolev-Yao model. Throughout the presentation, Giann explained basic security-related subjects, gave an overview of how to use ProVerif, and presented a case study of one of his past works.
This event was part of the Periodic Seminars organized by CISTER.

JOSÉ FONSECA SUCCESSFULLY DEFENDED HIS PHD THESIS AT FEUP

José Fonseca has successfully defended his PhD thesis, supervised by **Vincent Nélis** and **Luís Miguel Pinho**, at the Faculty of Engineering of the University of Porto, Portugal. His thesis, entitled **"Multiprocessor Scheduling and Mapping Techniques for Real-Time Parallel Applications"**, proposes schedulability analyses that take into account the complex internal structure of parallel tasks, modeled as DAGs, for both global and partitioned scheduling paradigms in multiprocessor systems.
Furthermore, it identifies and addresses the problem of proving timing guarantees for parallel applications which experience conditional execution due to explicit control flow.
The PhD juri committee had as main examiners Robert Davis (Senior Research Fellow at University of York, UK) and Eduardo Quiñones (Senior Researcher at Barcelona Supercomputing Center, Spain).

CISTER Quicknews

JANUARY - MARCH ISSUE, 2019

DISTINGUISHED SEMINARS BY SCIENTISTS FROM UNIVERSITY OF YORK AND FROM POLITECNICO DI MILANO

Robert I. Davis gave a distinguished seminar on "Transferring Real-Time Systems Research into Industrial Practice"

During this talk, Dr **Robert I. Davis** discussed two impact case studies where real-time systems research has been successfully transferred into industrial practice.

In each case, the technology created was translated into viable commercial products and led to significant advances in the automotive electronics and avionics domains, providing substantial returns on investment for the companies using the technology.

Robert I. Davis is a Reader in the Real-Time Systems Research Group at the University of York, UK. Robert received his PhD in Computer Science from the University of York in 1995. Since then he has founded three start-up companies, all of which have succeeded in transferring real-time systems research into commercial products. Robert's research interests include the following aspects of real-time systems: scheduling algorithms and analysis for single processor, multiprocessor and networked systems; analysis of cache related pre-emption delays, mixed criticality systems, and probabilistic hard real-time systems.

Stefano Zanero from Politecnico Di Milano presented a talk on "Breaking the Laws of Robotics: Attacking Industrial Robots", where he discussed vulnerabilities of industrial robots and the work achieved by his research group to address potential attacks.

Stefano presented a recent attack performed by his students to alter the precision of an industrial robot which can lead to potential harm to products and even users. Various use cases were discussed including an attack via insecure web interfaces, weak authentication protocols, exposure of industrial routers, etc. The impact of existing domain specific languages in this area was also discussed during this talk. More information around this work is available at robosec.org.

Stefano Zanero received a PhD in Computer Engineering from Politecnico di Milano, where he is currently an associate professor. His research focuses on malware analysis, cyberphysical security, and cybersecurity in general.

Besides teaching "Computer Security" and "Computer Forensics" at Politecnico, he has an extensive speaking and training experience in Italy and abroad. He co-authored over 70 scientific papers and books.

He is a Senior Member of the IEEE (for which he sits on the MGA board), the IEEE Computer Society (for which he is a member of the Board of Governors), and a lifetime senior member of the ACM.

Stefano co-founded the Italian chapter of ISSA (Information System Security Association).

He has been named a Fellow of ISSA and sits in its International Board of Directors. Stefano is also a co-founder and chairman of Secure Network, a leading information security consulting firm based in Milan and in London; a co-founder of 18Months, a cloud-based ticketing solutions provider; and a co-founder of BankSealer, a startup in the FinTech sector that addresses fraud detection through machine learning techniques.

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