IN THIS ISSUE

- Octavian Postolache nominated “Outstanding Reviewer” of the IEEE TIM for the second time
- HIPOF: Paving the way for high capacity POF based communications systems
- Project Snapshot: COMPRESS - All Optical Data Compression
- Where are you now?

Editorial

The Code for Public Contracts (CCP) was already the subject of an editorial where its negative influence on research and development activities in Portugal was described. However with the recent (January 2018) coming into force of the new CCP version things went from bad to worse.

The Government has obviously the right to legislate on the subject for its own institutions. It also has the right to impose rules concerning the use of public funds.

The real question is: why should this rules apply to private not-for-profit institutions while managing their own funds? An extreme example will help. If a private individual does not have to suffer with all the bureaucracy and pain of obeying CCP when buying a car with his own money, why should a private non-profit R&D Unit have to obey CCP rules when managing their private funds?

It must be repeated again and again that following CCP does not lead to better management or lower prices. On the contrary. It involves an immense amount of useless bureaucracy, consumes time and energy, and in the end leads to higher costs. In a nutshell, at least it promotes inefficiency and in many cases it ruins a project that must be run in time and within budget. The international R&D clock runs much faster than the CCP clock.

Carlos Salema

Coordinated by IT in Aveiro and the University of Aveiro (UA), in collaboration with several other Portuguese and Mozambican institutions, the DOPPLER – Development of PalOp knowledge in Radioastronomy partnership has received a funding of 300k Euros from the Aga Khan Foundation.

Arising from ENGAGE SKA, the Portuguese node of the Square Kilometer Array – SKA project, DOPPLER will promote collaborations between Portuguese and Mozambican institutions in the fields of Astronomy, Earth Observation, and “Big Data”, combining international synergetic capacity building projects in Africa and Europe aligned with programs such as SKA, Africa VLBI Network and Copernicus. These include initiatives to promote and strengthen mutual empowerment, particularly in advanced training with impact on biodiversity, food safety, and resource management.

The DOPPLER work plan includes: organizing pedagogical workshops; promoting synergies with the industry; leveraging internships and team visits between Portugal and Mozambique; organizing scientific and technological demonstrations in schools, universities and in the industry. These activities promote the implementation of the recommendations of the parliaments of the European Union and the African Union, which recognize Radio Astronomy as a motor of technological and scientific development with impact in a wide range of sectors. This is one of the exact sciences and engineering projects to be funded through the first joint FCT-Aga Khan Development Network – AKDN (http://www.akdn.org/where-we-work/europe/portugal) under the Knowledge for Development Initiative.

DOPPLER was presented this February 16 during the first workshop of “AKDN-FCT Collaborative Research Network in Portuguese speaking countries in Africa”, held in Parque da Ciência e Tecnologia of the University of Porto.

Carlos Salema

IT is a private non-profit association of Universities (UA, UC, IST, UBI, UP, ISCTE-IUL), Polytechnic of Leiria, Altice Labs and Nokia, with a mission to create and disseminate scientific knowledge in telecommunications. IT hosts and tutors graduate and postgraduate students.

Send your news and contributions for this newsletter to: news@it.pt

Edition: João Santos
Coordination: Carlos Fernandes
Octavian Postolache nominated “Outstanding Reviewer” of the IEEE TIM for the second time

Octavian Postolache, a researcher from IT in ISCTE-IUL, were he is also an Assistant Professor, was distinguished as one of the “Outstanding Reviewers of 2017” of the IEEE Transactions on Instrumentation and Measurement (TIM), published by the IEEE Instrumentation and Measurement Society (IMS). This is the second time that Octavian Postolache is nominated as an “Outstanding Reviewer” by the IEEE TIM, having received his first distinction in 2011.

Octavian Postolache was nominated for this award by one of TIM’s associate editors and, on behalf of the editorial board of the IEEE TIM and the IMS Publications Committee, Shervin Shirmohammadi (Editor-in-Chief) justified this distinction for the “invaluable, meticulous, objective, professional and timely manner” by which Octavian Postolache responded to a number of request-to-reviews in 2017. Working as an editor for TIM since 2000, during this period Octavian Postolache has reviewed more than 100 papers for this journal.

PROJECT SNAPSHOT

COMPRESS - All Optical Data Compression

Phononic Integrated Circuits (PIC) are the photonic counterparts of the massively deployed Electronic Integrated Circuits (EIC), using light instead of electrons to implement a large variety of optical functions. As a consequence superior high-speed transmission of very large volumes of data are allowed. Considering how EIC have fundamentally improved and changed our modern world, PIC are envisioned as a groundbreaking technology with applications ranging from telecom (data center interconnect and optical communications), to high performance computing, sensing and optical signal processing (e.g., data compression).

Project COMPRESS is focused on the development of optical tools that implement layers of (pre)optical compression, applicable to any type of signal (e.g., image, data). It went ahead the excellent results pioneered by project CITO, where the principles of optical transforms were applied to the compression and decompression of data. Considering the challenges brought by the encoding of high definition video, processing capacity needs to be able to keep up. Thus, significant advantages arise with their implementation in PIC where the above mentioned benefits combined with large energy savings relieve the current compression and decompression systems.

Project COMPRESS initiated with the implementation of a key element for optical signal processing (e.g., Haar Transform) the Magic-T. It consists on a 2x2 coupler that performs additions and subtractions of the input ports at its output ports carried out in the optical domain. Unlike CITO that employed 3 dB asymmetric couplers to implement the Magic-T,

Agenda

VTS PT Chapter / COST-IRACON Joint Winter School
Between 5th-9th March, IT hosted the Winter School on Beyond 5G Networks operating in the Millimetre Wavebands enabled by Joint Analogue-digital Signal Processing, to be held at the Instituto de Telecomunicações, IST, Torre Norte 10th-11th floor, Lisbon.
These 4.5 days training period addressed recent advances in antennas, RF, signal and multi-antenna processing, making use of information theoretic concepts, and designing the necessary modulation and coding schemes as well as spectrum management strategies, to achieve implementable Massive Antenna Array Systems (MAAS) technologies at mmW frequencies, with the ultimate goal of providing mobile communication systems that approach 1 Tbit/s data rate on a per link basis.
Business aspects, cost/revenue trade-off, standardization, public policies for spectrum sharing, entrepreneurship and IPR protection were also central parts of the training. The event also included training on research and a poster session.
URL: http://www.iracon.org/training-schools/

Workshop on Massive Array Antenna Systems for Millimeter Wavebands BSG Networks
On the last March 8th, within the Winter School on Beyond 5G Networks operating in the Millimetre Wavebands enabled by Joint Analogue-digital Signal Processing, IT organized a Workshop on Massive Array Antenna Systems for Millimetre Wavebands BSG Networks.
The workshop was held in the Holiday Inn Lisboa, Av. António José de Almeida, 28-A, Lisboa
URL: http://e-projects.ubi.pt/maas/
PROJECT SNAPSHOT — COMPRESS (continued from p. 2)

Compress uses Multi-Mode Interference (MMI) based couplers do design it. MMI structures present high tolerance to dimension changes in the fabrication process, low insertion losses, low polarization dependence, large optical bandwidth and the possibility to reduce the size of the component up to 1/10, enabling high levels of integration in the chip. Therefore, by making use of an MMI based approach for the Magic-T implementation, new PIC designs for the implementation of optical compression were designed and produced for two different main platforms: (i) the Indium Phosphide (InP), and (ii) di-ureasil–ZrOMc, an hybrid organic-inorganic material synthesized using the Sol-Gel process and pattern-able by single exposure Ultra-Violet (UV) photolithography.

Currently, a chip in InP platform for optical Haar Transform was submitted for implementation in a multi-process wafer run by the European Consortium PARADIGM and will be tested and characterized after delivery. Regarding the chips in di-ureasil–ZrOMc, engraving of waveguides using a pulsed UV laser in IT lab facilities is being carried out with an amplitude mask designed by the project researchers. The positive results obtained so far are reflected in a high number of publications, conference communications and the good engagement of the research team members.

Berta Neto

HIPOF: Paving the way for high capacity POF based communication systems

With the increasing need for greater data transmission capacity between computer and media equipment, such as equipment for future standards of 8K television and virtual reality, the buildings and condominiums’ network infrastructure has to be well prepared. Plastic Optical Fibers (POF) are indicated as the most suitable solution for these high capacity local networks. Due to their robustness, compared to silica fiber, the installation costs would be much lower.

POFs are also a very interesting alternative for the development of high-resolution optical sensors for measurements of temperature, deformation, shape, level and chemical elements.

The main advantages are the immunity to electromagnetic interference, the possibility of incorporating multiple sensors in a single fiber and mechanical resistance when compared with the glass fiber optic sensors.

In project HIPOF, a research team from IT in Aveiro is developing new techniques for processing plastic optical fibers for applications in data networks in buildings and sensors, substantially reducing the time required to connect these fibers.

“We have also developed an innovative technique that allows the production of high-quality optical filters, allowing a considerable increase in the data transmission capacity through the parallelization of data. This technique also makes it possible to substantially improve the technical characteristics of the optical sensors”, says Rogério Nogueira, researcher from IT in Aveiro and the project coordinator.

At the end of the project the research teams is expecting to achieve a new world record of transmission in these fibers.

Newsflash

Team “Just DuoIT” wins the Blokus Duo competition at the REC 2018

The team “Just DuoIT”, with Fábio Coutinho and José Domingues, from the 4th year of the MSc in Electronic Engineering and Telecom-unications and fellows of IT, both supervised by Arnaldo Teixeira (IT/DETI-UA) won the competition Acelarador Blokus Duo in the Pro category. This competition took place within the XIV Jornadas sobre Sistemas Recon-figuráveis - REC 2018 held in the Faculdade de Ciências e Tecnologia of the University Nova de Lisboa last February 15-16. Besides the certificate, the winning duo also received a DE10-Standard kit, courtesy of Terasic and Intel FPGA.

Portuguese Prime Minister António Costa joins the BITalino “fanclub”

During a visit to the Escola Superior de Tecnologia of the Instituto Politécnico de Setúbal (EST-IPS), the Portuguese Prime Minister António Costa had the chance to know more about BITalino, the spin-off technology developed in IT that allows anyone to create projects and learn how to use biosignals in the most varied biomedical applications.

“He was particularly pleased with the fact that the production and design of the equipment are made in Portugal”, said Hugo Silva, Professor at the EST-IPS and the IT researcher who developed BITalino.

Research team from IT wins the PHOTOPTICS 2018 Best Paper Award

Ricardo Soeiro, Tiago Alves and Adolfo Cartaxo, researchers from the Optical Communications and Photonics Group from IT in Lisbon, were distinguished with the Best Paper Award for their work “On the Probability Density Function of Inter-core Crosstalk Power in Birefringent Homogeneous Multi-core Fibers”, in the 6th International Conference on Photonics, Optics and Laser Technology – PHOTOPTICS 2018, held in Funchal, Madeira, from 25-27 January.
Where are you now?

Hugo Plácido da Silva
Sharing my learning and accomplishments at IT with the world! I first joined the lab in 2004 while pursuing a MSc in Electrical and Computer Engineering (ECE) at Instituto Superior Técnico (IST), under the supervision of Professor Ana Fred and integrated on what evolved to become the Pattern and Image Analysis (PIA) group. This work proposed several contributions, especially to the then emerging field of biometric sensing, and was a corollary of the unique environment found at IT. My MSc started me on a path in entrepreneurship as one of the co-founders of PLUX - Wireless Biosignals, S.A., a company established in 2007 to develop innovative biomedical solutions.

When an opportunity came to further develop my skills, there was no place other than the IT where I saw myself doing so, and in 2010 I joined the lab as a full time researcher once again enrolled in a PhD in ECE at IST with a scholarship from the Fundação para a Ciência e Tecnologia (FCT) and Professor Ana Fred as supervisor. Completed in 2013, my dissertation proposed new methods and applications of physiological sensing, and was a corollary of the unique environment found at IT. Results include a patented technology for “off-the-person” ECG biometrics and establishing the foundations to what is currently Cardioid - Technologies Ltda., founded in 2014. The most iconic output, however, was BITalino, an award-winning low-cost hardware and open source software toolkit, recently recognised by the European Commission’s DG-CONNECT as the best “Industrial and Enabling Tech” in their Innovation Radar Prize 2017. Now with thousands of devices in use by leading academia, industry and individuals at large in more than 60 countries, BITalino is redefining biomedical education, research and prototyping, and it all sprung out of the ingenuity fostered by IT.

Today I’m still a very proud Researcher at IT, an Invited Adjunct Professor at the Polytechnic Institute of Setúbal and Chief Innovation Officer at PLUX. I’ll be forever grateful to IT for providing the groundings and culture of excellence upon which most of these achievements are rooted, and can only hope that others may benefit from such a stellar experience.

Latest concluded PhDs hosted by IT

Carlos Pereira
Towards Efficient Mobile IoT with Heterogeneous Networks
PhD in Electrical and Computer Engineering by Faculdade de Engenharia of the University of Porto (FEUP), October 2017, supervised by Ana Aguilar (IT/FEUP).
The thesis characterizes, evaluates, and improves the performance of mobile gateways in Machine-to-Machine communications, investigating the benefits of the interoperability introduced by standards, of the concurrent use of different networks in heterogeneous networks scenarios as well as of the exploitation of opportunistic transmissions and the use of network coding techniques.
Carlos is currently a Post-Doctoral researcher at IT.

Shantanav Chakraborty
Robustness in spatial search by continuous time quantum walk
PhD in Electrical and Computer Engineering by IST, University of Lisbon, December 2017, supervised by Yasser Omar (IT/IST).
The thesis analyzes the robustness of the quantum spatial search algorithm to various kinds of errors. It makes general statements about the optimality of this algorithm on any graph. It also shows that a noisy environment, often thought to be detrimental for quantum computation, can actually be useful for this quantum algorithm in some regimes. Shantanav is currently a Postdoc researcher at Center for Quantum Information and Communication at Université Libre de Brussels, Belgium.

Nelson Capela
Intelligent and Transparent Resource Management
PhD in Electrical Engineering by University of Aveiro (UA), March 2017, supervised by Susana Sargento (IT/UA).
The thesis proposes a new approach/machanism to allow an intelligent decision in the simultaneous use of several interfaces/paths for end-users and their services, enabling seamless mobility between homogeneous/heterogeneous networks and optimizing the use of the available resources. It makes use of relevant techniques like Machine Learning and Network Coding and, was validated assuming real environments, like vehicular networks. Nelson is an Embedded Software Engineer at Bosch, Aveiro, Portugal.

António Martins
Ground Electrodes: Analysis and optimized design in a two layer soil
PhD in Electrical and Computer Engineering by University of Beira Interior (UBI), June 2017, supervised by Silvio Mariano (IT/UBI).
The thesis analyzes ground electrodes, in homogeneous and in two layer soils, using the matrix method, the method of moments and the finite elements method. Soil models for one, two and three layers are considered. Optimization techniques, are used to compute a soil model. Finally field measurements are presented. António is currently an Assistant Professor in Instituto Politécnico da Guarda, Portugal.