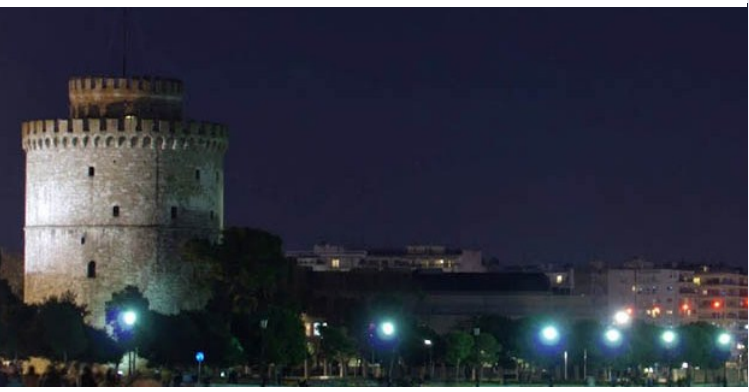
MOCAST

INTERNATIONAL CONFERENCE ON

MODERN CIRCUITS AND SYSTEMS TECHNOLOGIES



Conference Guide

5-7 July 2021
Thessaloniki, Greece

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About MOCAST

The International Conference on Modern Circuits and Systems Technologies (MOCAST) on Electronics and Communications aims to bring together leading academic and industrial scientists and researchers to exchange and share their knowledge and experiences about all aspects of Circuits and Systems. It also provides a forum for exchanging ideas, discussing research results, and presenting practical applications in the areas of modeling, design, simulation, synthesis and implementation of Circuits and Systems. It provides an interdisciplinary and multidisciplinary forum for researchers, engineers and educators to present and discuss the most recent innovations, trends, and concerns, practical challenges encountered and the solutions adopted in these fields.

MOCAST 2021 was scheduled to be held in Thessaloniki, Greece. However, since the safety and well-being of all conference participants is our priority, MOCAST 2021 will now be held virtually.

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Keynote Speeches

Keynote Speech 1

Memristor Cellular Nonlinear Networks : Computing by Complexity

Prof. Ronald Tetzlaff, Institute of Circuits and Systems, TU Dresden, Germany

Short CV: Ronald Tetzlaff is a Full Professor of Fundamentals of Electrical Engineering at the Technische Universtität Dresden, Germany. From 1999 to 2003 Ronald Tetzlaff was Associate Editor of the IEEE, Transactions on Circuits and Systems: part I. He was "Distinguished Lecturer" of the IEEE CAS Society (2001 to 2002). He is a member of the scientific committee of different international conferences. He was the chair of the 7th IEEE International Workshop on Cellular Neural Networks and their Applications (CNNA 2002) and organized several special sessions at circuit and systems related conferences. From 2005 to 2007 he was the chair of the IEEE Technical Committee Cellular Neural Networks & Array Computing. Ronald Tetzlaff is a member of the Informationstechnische Gesellschaft (ITG) and the German Society of Electrical Engineers and of the German URSI Committee. Ronald Tetzlaff is in the Editorial Board of the International Journal of Circuit Theory and Applications since 2007 and he is also in the Editorial Board of the IEEE, Transactions on Circuits and Systems: part II since 2016. He was Associate Editor of the AEÜ – International Journal of Electronics and Communications from 2008 to 2016. Ronald Tetzlaff was the chair of the 18th IEEE Workshop on Nonlinear Dynamics of Electronic Systems (NDES 2010), the chair of the 5th International Workshop on Seizure Prediction (IWSP5 2012) , the chair of the 21st European Conference on Circuit Theory and Design (ECCTD 2013), the chair of the 5th Memristor and Memristive Symposium 2016, and of the 15th IEEE International Workshop on Cellular Nanoscale Networks and their Applications (CNNA 2016). Since 2014 he serves as the leader of working group 2 (Memristor Theory, Modelling and Simulation) in the EU COST action MemoCIS (IC 1401) on Memristors – Devices, Models, Circuits, Systems and Applications. Ronald Tetzlaff serves as a reviewer for several journals and for the European Commission.

Keynote Speech 2

Building a Smart EM Environment for New Communication Systems and Applications

Prof. Andrea Massa, University of Trento, Italy

Abstract: The exponential growth of mobile data traffic in last decades is expected to further increase in the next years, while all users are waiting to experience multi-gigabit-per-second connections at any time. Towards this ends, wireless infrastructures for future generation "5G/6G+" mobile communications systems are required to guarantee unprecedented link performance levels, while minimizing the complexity, the power consumption and the cost of the architecture. Moreover, alternative solutions to the approach "more information and data through more power and more emis-

sions of electromagnetic waves" are mandatory because of the 'electromagnetic congestion'. This can be done by implementing a "smart electromagnetic environment" as an update of the standard concepts of 'wireless infrastructure' and 'wireless channel'. Indeed, while traditional communication systems focus the radiated power along the terminal direction to maximize the link quality and the information transfer by, for instance, increasing the antenna gain and reducing the sidelobe level (SLL), the signal-to-noise ratio (SNR) maximization next generation multi-user multi-antenna architectures can be yielded by spatially distributing the power to constructively exploit the wave scattering phenomena in the multi-path propagation environment, regardless of the gain, the SLL, or the grating lobes (GLs). On the other hand, the idea of the scattering/propagation scenario has to be changed from the role of 'negative' factor (i.e., an obstacle to the electromagnetic propagation) to that of a 'factor to be exploited for propagating signals' (e.g., the synthesis of a base station is carried out by including the propagation scenario within the design process) up to an 'enabling tool'. Of course, implementing the 'smart electromagnetic environment' needs suitable processing tools and techniques allowing the mandatory 'environment/infrastructure' reconfigurability. This talk will review some ongoing activities towards the implementation of the 'smart electromagnetic environment' ranging from a capacity-driven design of wireless infrastructures, the synthesis of the 'smart skin' for field manipulation, and the compressive-processing of sensing and communication signals.

Short CV: Andrea Massa (IEEE Fellow, IET Fellow, Electromagnetic Academy Fellow) he has been a Full Professor of Electromagnetic Fields @ University of Trento since 2005. At present, Prof. Massa is the director of the network of federated laboratories "ELEDIA Research Center" located in Brunei, China, Czech, France, Greece, Italy, Japan, Perù, Tunisia with more than 150 researchers. Moreover, he is holder of a Chang-Jiang Chair Professorship @ UESTC (Chengdu – China), Professor @ CentraleSupélec (Paris - France), and Visiting Professor @ Tsinghua (Beijing - China). He has been holder of a Senior DIGITEO Chair at L2S-CentraleSupélec and CEA LIST in Saclay (France), UC3M-Santander Chair of Excellence @ Universidad Carlos III de Madrid (Spain), Adjunct Professor at Penn State University (USA), Guest Professor @ UESTC (China), and Visiting Professor at the Missouri University of Science and Technology (USA), the Nagasaki University (Japan), the University of Paris Sud (France), the Kumamoto University (Japan), and the National University of Singapore (Singapore). He has been appointed IEEE AP-S Distinguished Lecturer (2016-2018) and served as Associate Editor of the "IEEE Transaction on Antennas and Propagation" (2011-2014). His research activities are mainly concerned with inverse problems, antenna analysis/synthesis, radar systems and signal processing, cross-layer optimization and planning of wireless/RF systems, system-by-design and materialby-design (metamaterials and reconfigurable-materials), and theory/applications of optimization techniques to engineering problems (coms, medicine, and biology). Prof. Massa published more than 700 scientific publications among which more than 350 on international journals (> 12.000 citations – h-index = 55 [Scopus]; > 9.500 citations – h-index = 48 [ISI -WoS]; > 20.000 citations – h-index = 80 [Google Scholar]) and more than 500 in international conferences where he presented more than 200 invited contributions (> 35 invited keynote speaker) (www.eledia.org/publications). He has organized more than 100 scientific sessions in international conferences and has participated to several technological projects in the European framework (>20 EU Projects) as well as at the national and local level with

Keynote Speeches

Keynote Speech 3

Next Generation Internet of Things: Requirements, Applications & Paradigms

Prof. Panagiotis Sarigianidis, University of Western Macedonia, Greece

Abstract: The Internet of Things (IoT) is enabled by heterogeneous technologies, devices, and platforms, working together towards providing efficient sensing, collecting, acting, processing, managing and analysing data. The emergence of the IoT concept has led to the pervasive interconnection of people, services, and devices. However, new systems in the IoT domain that employ smart solutions having embedded intelligence, connectivity and processing capabilities for edge devices rely on real-time processing at the edge of the IoT network – near the end user. Edge Computing is widely recognized as a basic technological pillar of the Next Generation IoT (NG-IoT). This innovation combined with distributed artificial intelligence and machine learning paves the way for the deployment of upcoming trends towards supporting and programming millions of new devices, which require the coordination and processing of huge amounts of data. NG-IoT systems and solutions require low latency and ultra-fast analytics, given that they bring advanced smart technologies and applications with embedded intelligence, connectivity, and processing capabilities. This talk will go through NG-IoT requirements, applications, and paradigms, supported by cutting-edge technologies like 5G communications, edge computing, advanced machine learning, blockchain, software defined solutions and network function virtualization, which aim at offering a new amazing world of ultra-high data rates, increased reliability and coverage, improved resource utilization, security, better cost efficiency, adaptability, and scalability.

Short CV: Prof. P. Sarigiannidis is an Associate Professor in the Department of Electrical and Computer Engineering in the Univ. of Western Macedonia, Kozani, Greece since 2016. He received the B.Sc. and Ph.D. degrees in computer science from the Aristotle Univ. of Thessaloniki, Greece, in 2001 and 2007, respectively. He has published over 200 papers in international journals, conferences and book chapters, including IEEE Communications Surveys and Tutorials, IEEE Transactions on Communications, IEEE Internet of Things, IEEE Transactions on Broadcasting, IEEE Systems Journal, IEEE Wireless Communications Magazine, IEEE Open Journal of the Communications Society, IEEE/OSA Journal of Lightwave Technology, IEEE Access, and Computer Networks. He has been involved in several national, European and international projects. He is currently the project coordinator of three H2020 projects, namely a) H2020 -DS-SC7-2017 (DS-07-2017), SPEAR: Secure and PrivatE smArt gRid, b) H2020-LC-SC3-EE-2020-1 (LC-SC3-EC-4-2020), EVIDENT: bEhaVioral Insgihts anD Effective eNergy policy acTions, and c) H2020-ICT-2020-1 (ICT-56-2020), TERMINET: nexT gEneRation sMart INterconnectEd ioT, while he coordinates the Operational Program MARS: sMart fArming with dRoneS (Competitiveness, Entrepreneurship, and Innovation) and the Erasmus+ KA2 ARRANGE-ICT: SmartROOT: Smart faRming innOvatiOn Training. He also serves as a principal investigator in the H2020-SU-DS-2018 (SU-DS04-2018), SDN-microSENSE: SDN-microgrid reSilient Electrical eNergy SystEm and in three Erasmus+ KA2: a) ARRANGE-ICT: pArtneRship foR AddressiNG mEgatrends in ICT, b) JAUNTY: Joint undergAd-

uate coUrses for smart eNergy managemenT sYstems, and c) STRONG: advanced firST RespONders traininG (Cooperation for Innovation and the Exchange of Good Practices). His research interests include telecommunication networks, internet of things and network security. He is an IEEE member and participates in the Editorial Boards of various journals, including International Journal of Communication Systems and EURASIP Journal on Wireless Communications and Networking.

Keynote Speech 4

Robust Perception for Autonomous Robot Systems

Prof. Lazaros Nalpantidis, Technical University of Denmark - DTU

Abstract: In this talk I will discuss about what defines an Autonomous System and how research can pave the way towards Autonomous Robots. I will argue that robust perception is key element to this direction and that the way to achieve it is through the incorporation of artificial intelligence and machine learning techniques for adapting and coping with un-foreseen situations. Finally, I will conclude with concrete examples from ongoing research projects where autonomous operation is being pursued on the basis of robust perception mechanisms.

Short CV: Lazaros Nalpantidis is an Associate Professor of cognitive robotics and robot perception in the Department of Electrical Engineering, Technical University of Denmark (DTU). Before, he was an Associate Professor of Cognitive Robotics at Aalborg University Copenhagen, Denmark, where he also served as Head of Section for Sustainable Production within the Department for Materials and Production. He holds a B.Sc. (2003) in Physics and a M.Sc. (2005) (with Honors) in Electronic Engineering from Aristotle University of Thessaloniki, Greece. He received a Ph.D. (2010) in Robotic Vision from Democritus University of Thrace, Greece. He has been a post-doctoral researcher at the Centre for Autonomous Systems (CAS), Computer Vision & Active Perception Lab. (CVAP) of the Royal Institute of Technology (KTH), Sweden. Lazaros organized and chaired the 10th International Conference on Computer Vision Systems (ICVS 2015) in Copenhagen, co-organized various workshops on Cognitive Robotics, and has served as editor and guest editor in various journals on robotics and robot vision. He has been involved in numerous research projects funded by the European Commission, European Space Agency, as well as Greek, Swedish and Danish states.

Monday, July 5th

09:00-09:30 (GMT+03:00)	**Opening**
09:30-11:00 (GMT+03:00)	**Session 1: Analog RF and mixed signal circuits** **Chairs: Prof. A. Hatzopoulos, Dr. Ch. Theodorou.**
paper 2	A New Switching Scheme For High-Voltage Switched Capacitor DC-DC Converter. Frank Vanselow[1], Prajith Poongodan[1], Oleg Sakolski[1], and Linus Maurer[2]. [1]Fraunhofer EMFT, Germany [2]Univ. of Bundeswehr Munich, Germany
paper 6	Ultra-Low Power, Low-Voltage, Fully-Tunable, Bulk-Controlled Bump Circuit Vassilis Alimisis, Marios Gourdouparis, Christos Dimas and Paul P. Sotiriadis Dpt. of Electrical and Computer Engineering, National Technical University of Athens, Greece
paper 9	On the Realization of Power-Law Based Impedance Functions: Application to Edible Drinks. S. Kapoulea[1], C. Psychalinos[1] and A. S. Elwakil[2] [1]Physics Dpt, Electronics Lab.,Univ. of Patras, Greece. [2]Dpt. of Electrical and Computer Eng., College of Engineering, University of Sharjah, UAE.
paper 35	Design considerations for a DC-DC Boost Converter in standard CMOS technology. V. Gogolou[1], Z. Agorastou[1], V. Kalenteridis[1] , K. Kozalakis[1], I. Kosmadakis[1], K. Siozios[1], E. Koutroulis[2] and S. Siskos[1] [1]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [2]Technical University of Crete, Chania, Greece
paper 66	A novel time register with process and temperature calibration Panetas-Felouris Orfeas and Spyridon Vlassis Physics Dpt, Electronics Lab.,Univ. of Patras, Greece
11:00-11:15 (GMT+03:00)	**Short Break**
11:15-12:15 (GMT+03:00)	**Keynote Speech 1** **Memristor Cellular Neural Networks: Computing by Complexity** **Speaker : Prof. Ronald Tetzlaff** **Chair: Dr. Yannis Messaris.**

Monday, July 5th	
12:15-12:30 (GMT+03:00)	**Short Break**
12:30-14:00 (GMT+03:00)	**Session 2: Sensors and Systems** **Chair: Prof. R. Picos.**
paper 88	Inter-tier Coupling Analysis in Back-illuminated Monolithic 3DSI Image Sensor Pixels Petros Sideris[1], Arnaud Peizerat[2], Perrine Batude[2], Christoforos Theodorou[1], Gilles Sicard[2] [1]IMEP-LAHC, Grenoble INP, France [2]CEA-LETI, France
paper 8	Sensor Design for Inductive Proximity and Moving Direction Sensing of Metal Targets Cristinel Ababei and James E. Richie Dpt of Electrical and Computer Engineering, Marquette Univ., Milwaukee WI, USA
paper 37	Real-time pulse oximetry extraction using a lightweight algorithm and a task pipeline scheme John Vourvoulakis[1], Leonardos Bilalis[2] [1]Dpt of Computer, Informatics and Telecommunications Eng., International Hellenic Univ, Serres, Greece [2]Dpt. of Industrial Management and Technology, Univ. of Piraeus, Greece
paper 71	Fatigue Detection Using Deep Long Short-Term Memory Autoencoders. Konstantinos Balaskas and Kostas Siozios Physics Dpt, Aristotle Univ of Thessaloniki, Greece
paper 17	Wireless Sensor Network Topology Design for Building Information Modelling. D. E. Kontaxis, G. V. Tsoulos and G. Athanasiadou University of Peloponnese, Tripolis, Greece
14:00-15:00 (GMT+03:00)	**Break**
15:00-16:48 (GMT+03:00)	**Session 3: Digital Circuits** **Chairs: Prof. K. Siozios and Prof. K. Tatas**
paper 47	ApproxQAM: High-Order QAM Demodulation Circuits with Approximate Arithmetic Vasileios Leon, Ioannis Stratakos, Giorgos Armeniakos, George Lentaris and Dimitrios Soudris School of Electrical and Computer Engineering, National Technical Univ. of Athens, Greece

Monday, July 5th	
paper 72	Effect Analysis of Low-Level Hardware Faults on Neural Networks using Emulated Inference Fin Hendrik Bahnsen, V. Klebe, Goerschwin Fey Inst. of Embedded Systems, Hamburg Univ. of Technology, Germany
paper 87	Incremental Lagrangian Relaxation based Discrete Gate Sizing and Threshold Voltage Assignment Dimitrios Mangiras and Giorgos Dimitrakopoulos Dpt of Electrical and Computer Engineering, Democritus Univ. of Thrace, Greece
paper 107	A Novel Low-power Neuromorphic Circuit based on Izhikevich Model Maria Sapounaki and Athanasios Kakarountas Computer Science and Biomedical Informatics, Univ. of Thessaly, Lamia, Greece
paper 108	Hardware Aspects of Parallel Neural Network Implementation I. Kouretas and V. Paliouras Dpt of Electrical and Computer Eng, Univ of Patras, Greece
paper 115	FPGA Acceleration of Generative Adversarial Networks for Image Reconstruction D. Danopoulos, K. Anagnostopoulos, Ch. Kachris and D. Soudris School of Electrical and Computer Eng., NTUA, Greece
16:48-17:00 (GMT+03:00)	**Short Break**
17:00-18:40 (GMT+03:00)	**Poster Session 1** **Chairs: Prof. M. Dasygenis and Mr. G. Kousiopoulos**
paper 24	Optimal Power Management for Residential PEV Chargers with Frequency Support Capability. I. Kalaitzakis, M. Dakanalis and F. D. Kanellos School of Electrical and Computer Engineering, Technical University of Crete, Greece.
paper 27	Using Genetic Algorithms to Optimize the Instruction-Set Encoding on Processor Cores Moritz Weißbrich[1], Javier Andres Moreno-Medina[2] and Guillermo Paya-Vaya[1] [1]Chair for Chip Design for Embedded Computing, Technische Universitat Braunschweig, Germany [2]Institute of Microelectronic Systems, Leibniz Universitat Hannover, Germany

Monday, July 5th	
paper 41	Time-Near-Optimal Longitudinal Control for Quadrotor UAVs D. Nikitas, K. Papafotis and P. P. Sotiriadis Dpt. of Electrical and Computer Engineering, National Technical Univ. of Athens, Greece
paper 45	A Simplified Model of Tantalum Oxide Based Memristor and Application in Memory Crossbars Valeri Mladenov and Stoyan Kirilov Dpt of Theoretical Electrical Engineering, Technical Univ. of Sofia, Bulgaria
paper 54	Experimental Study of a Low-Voltage PV Cell-Level DC/AC Converter N. Rigogiannis[1], A. Boubaris[1], Z. Agorastou[2], N. Papanikolaou[1], S. Siskos[2] and E. Koutroulis[3]. [1]Dpt of Electrical and Computer Eng., Democritus Univ. of Thrace, Greece [2]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [3]School of Electrical and Computer Eng., Technical Univ. of Crete, Greece.
paper 65	PATARA: A REVERSI-Based Open-Source Tool for Post-Silicon Validation of Processor Cores Fabian Stuckmann[1], Pasha A. Fistanto[2], and Guillermo Paya-Vaya[1] [1]Chair for Chip Design for Embedded Computing, Technische Universitat Braunschweig, Germany [2]Institute of Microelectronic Systems, Leibniz Universitat Hannover, Germany
paper 73	FPGA Implementation of LDPC Decoder Architecture for Wireless Communication Standards Ruslan Goriushkin, Pavel Nikishkin, Evgeny Likhobabin and Vladimir Vityazev Department of Telecommunications and foundations of radio engineering, Ryazan State Radio Engineering University, Russia
paper 75	Block Error Performance of PAM or PPM SIMO FSO Links over Strong Turbulence Channels N.A. Androutsos[1], H.E. Nistazakis[1], A.N. Stassinakis[1], E.V. Chatzikontis[1], A.D. Tsigopoulos[2], E. Roditi[1] and G.S. Tombras[1] [1]Dpt of Physics, Section of Electronic Physics and Systems, National and Kapodistrian Univ of Athens, Greece [2]Sector of Battle Systems, Naval Operations, Sea Studies, Navigation, Electronics and Telecommunications, Hellenic Naval Academy, Piraeus, Greece

Monday, July 5th	
paper 77	Multi-Objective Optimization Methods for CMOS LC-VCO Design M.E. Plagaki, K. Touloupas, and P. P. Sotiriadis National Technical University of Athens, Greece
paper 100	A PID controller design to suppress chatter vibrations in the turning process & studying its effect in nonlinear delayed process Mohsen Khajoee and Hamed Moradi Dpt of Mechanical Engineering, Sharif Univ. of Technology, Iran
paper 101	A Heterogeneous Lightweight Network for Plant Disease Classification Th. Sanida, D. Tsiktsiris, A. Sideris and M. Dasygenis Department of Electrical & Computer Engineering, University of Western Macedonia, Greece
paper 102	Studying the impacts of loop unrolling and pipeline in the FPGA design of the Simon and RoadRunneR lightweght ciphers G. Georgiou and G. Theodoridis Electrical and Computers Engineering Department, Univ. of Patras, Greece
paper 112	Role of Underlap Structure in Boosting the Performance of Band-to-Band Tunneling Carbon Nanotube FET with 5-nm Gate Length Khalil Tamersit [1,2,3] [1]Department of Electronics and Telecommunications, Université 8 Mai 1945 Guelma, Algeria. [2]Department of Electrical and Automatic Engineering, Université 8 Mai 1945 Guelma, Algeria. [3]Laboratory of Inverse Problems, Modeling, Information and Systems (PIMIS), Université 8 Mai 1945 Guelma, Algeria.
paper 113	Junctionless Carbon Nanotube Field-Effect Transistors as Gas Nanosensors for Low-Power Environment Monitoring Applications. Khalil Tamersit [1,2,3] [1]Department of Electronics and Telecommunications, Université 8 Mai 1945 Guelma, Algeria. [2]Department of Electrical and Automatic Engineering, Université 8 Mai 1945 Guelma, Algeria. [3]Laboratory of Inverse Problems, Modeling, Information and Systems (PIMIS), Université 8 Mai 1945 Guelma, Algeria.

Tuesday, July 6th

09:00-10:48 (GMT+03:00)	Session 4: Communication and network systems Chair: Prof. A. Polo.
paper 14	Pathloss modeling for in-body optical wireless communications Stylianos E. Trevlakis, Alexandros-Apostolos A. Boulogeorgos, and Nestor D. Chatzidiamantis Dpt. of Electrical and Computer Engineering, Aristotle Univ. of Thessaloniki, Greece
paper 19	Design and Analysis of an Implantable Dual-Band Antenna for Pancreas Biotelemetry M. Matthaiou, S. Koulouridis and S. Kotsopoulos Electrical and Computer Engineering Department, University of Patras, Greece
paper 25	Dual-hop Blockchain Radio Access Networks for Advanced Coverage Expansion Theofilos Sachinidis[1], Alexandros-Apostolos A. Boulogeorgos[2,1], and Panagiotis Sarigiannidis[1] [1]Department of Electrical and Computer Engineering, University of Western Macedonia, Greece, [2]Dpt of Digital Systems, Univ. of Piraeus, Greece
paper 57	High-Selectivity Single- and Dual-Band BPF Using a Cross Shaped Coupled-Line Resonator Aqeela Saghir[1], David Chatzichristodoulou[2,3], Abdul Quddious[4], Symeon Nikolaou[1,2], Vryonides Photos[1,2] [1]Frederick University, Cyprus [2]Frederick Research Center, Cyprus [3]RF and Microwave Solutions, Nicosia, Cyprus [4]KIOS Research and Innovation Center of Excellence, University of Cyprus, Cyprus
paper 79	On the Fairness of DCTCP and CUBIC in Cloud Data Center Networks K. G. Tsiknas, P. I. Aidinidis, K. E. Zoiros Department of Electrical and Computer Engineering, Democritus University of Thrace, Greece
paper 49	Advanced Teaching in Electromagnetics at the ELEDIA Research Center A. Polo[1], Hanen Ahmadi[2], Sotirios K. Goudos[3], Jun Hu[4], Jin Huang[5], Moman Khan[1], Baozhu Li[6], Maokun Li[6], Giacomo Oliveri [1,7], Paolo Rocca [1,5], Marco Salucci[1], Fan Yang[6], Shiwen Yang[4], and Andrea Massa [1,4,6] [1]CNIT – "University of Trento" Research Unit, Italy [2] ELEDIA Research Center (ELEDIA@Innov'COM – Sup'COM), Tunisia

Tuesday, July 6th	
	[3]ELEDIA Research Center (ELEDIA@AUTH – Aristotle University of Thessaloniki), Greece [4]ELEDIA Research Center (ELEDIA@UESTC – UESTC), China [5] ELEDIA Research Center (ELEDIA@XIDIAN – Xidian University), China [6] ELEDIA Research Center (ELEDIA@TSINGHUA – Tsinghua University), China [7] ELEDIA Research Center (ELEDIA@L2S – UM-R8506), Gif-sur-Yvette, France
10:48-11:00 (GMT+03:00)	**Short Break**
11:00-12:00 (GMT+03:00)	**Keynote Speech 2:** **Building a Smart EM Environment for New Communication Systems and Application** **Speaker: Prof. Andrea Massa** **Chair: Prof. S. Goudos**
12:00-12:15 (GMT+03:00)	**Short Break**
12:15 –13:45 (GMT+03:00)	**Session 5 : Systems and applications** **Chair: Prof. A. Garcia-Ortiz**
paper 11	ATLAS toward the High Luminosity era: challenges on electronic systems Junjie Zhu, on behalf of the ATLAS Collaboration Department of Physics, University of Michigan, USA
paper 13	Photovoltaic Faults: A comparative overview of detection and identification methods Stylianos Voutsinas, Dimitrios Karolidis, Ioannis Voyiatzis, Maria Samarakou, Department of Informatics and Computer Engineering, University of West Attica, Greece.
paper 20	Nonlinear System Identification: Prediction Error Method vs Neural Network Jinming Sun[1], Yanqiu Huang[2], Wanli Yu[1] and Alberto Garcia-Ortiz[1]. [1]University of Bremen, Germany [2]University of Twente, The Netherlands
paper 30	An Improved Approximation of Grunwald-Letnikov Fractional integral Alaa Abdalrhman[1], Amr Abdelaty[2], Ahmed Soltan[1], Ahmed G. Radwan[3,4]

Tuesday, July 6th	
	[1]Nanoelectronics Integrated Systems Center, Nile University, Egypt. [2]Engineering Mathematics and Physics Dpt, Faculty of Engineering, Fayoum University, Egypt. [3]Engineering Mathematics and Physics Dpt, Faculty of Engineering, Cairo University, Egypt [4]School of Engineering and Applied Sciences, Nile University, Egypt.
paper 56	Energy Efficient Speech Command Recognition for Private Smart Home IoT Applications Christos Zonios and Vasileios Tenentes Dpt. of Computer Science and Engineering, University of Ioannina, Greece
13:45-14:45 (GMT+03:00)	**Break**
14:45-15:45 (GMT+03:00)	**Keynote Speech 3** **Next Generation Internet of Things: Requirements, Applications & Paradigms** **Speaker: Prof. Panagiotis Sarigiannidis** **Chair: Prof. S. Goudos**
15:45-16:00 (GMT+03:00)	**Short Break**
16:00-17:30 (GMT+03:00)	**Session 6: Power electronics, control systems and signal analysis** **Chair: Dr. V. Konstantakos**
paper 5	Comparative Performance Evaluation of Multiport DC/AC Inverters for Distributed Generation Applications Ioannis Roditis and Eftichios Koutroulis School of Electrical and Computer Engineering, Technical University of Crete, Greece
paper 29	The role of diodes in the leakage current suppression mechanism of decoupling transformerless PV inverter topologies. G. I. Orfanoudakis[1], E. Koutroulis[2], G. Foteinopoulos[2] [1]Hellenic Meditteranean University, Greece [2]Technical University of Crete, Greece.
paper 103	Design and implementation of an intelligent control system for a lower-limb exoskeleton to reduce human energy consumption. H. Talatian, M. Karami, H. Moradi and G. Vossoughi School of Mechanical Engineering, Sharif University of Technology, Iran

Tuesday, July 6th

paper 97	Using a combination of vibration absorber and a classical active controller to suppress the chatter vibration and increase the stability in turning process Yashar Ebadi and Hamed Moradi Department of Mechanical Engineering, Sharif University of Technology, Iran
paper 70	Exploring the Effectiveness of Sigma-Delta Modulators in Stochastic Computing-Based FIR Filtering A. Vlachos, N. Temenos and P. P. Sotiriadis Department of Electrical and Computer Engineering, National Technical University of Athens, Greece
17:30-19:01 (GMT+03:00)	**Poster Session 2** **Chairs: Dr. A. Boursianis, Dr. M. Papadopoulou**
paper 32	Extending Two Classes Of Networks Using Three Topological Transformations Cristian E. Onete[1], Maria Cristina C. Onete[2] [1]Former NXP Semiconductors, The Netherlands [2]XLIM/Univ. of Limoges/CNRS 7252,France
paper 46	On the Resource Allocation of Hierarchical NOMA for Fog-RAN with Energy Harvesting Vasilis K. Papanikolaou[1], Nikos A. Mitsiou[1], Panagiotis D. Diamantoulakis[1], Sotirios K. Goudos[2] and George K. Karagiannidis[1] [1]Dpt of Electrical and Computer Engineering, Aristotle Univ. of Thessaloniki, Greece [2]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece
paper 48	Performance Evaluation of LoRa Networks in an Open Field Cultivation Scenario Aikaterini Griva[1], Achilles D. Boursianis[1], Shaouha Wan[2], Panagiotis Sarigiannidis[3], George Karagiannidis[4], Sotirios K. Goudos[1] [1]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [2]School of Information and Safety Eng, Zhongnan Univ. of Economics and Law, Wuhan, Hubei, China [3]Dpt of Electrical and Computer Engineering, University of Western Macedonia, Greece [4]School of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Greece
paper 50	Dual-Band Frequency Selective Surface Design Using Harris Hawks Optimization Achilles D. Boursianis[1], Marco Salucci[2], Stavros Koulouridis[3], Apostolos Georgiadis[4], Manos Tentzeris[5], Sotirios K. Goudos[1]

Tuesday, July 6th	
	[1]ELEDIA@AUTH, School of Physics, Aristotle Univ. of Thessaloniki, Greece [2]ELEDIA Research Center, University of Trento, Italy [3]Dpt of Electrical and Computer Eng, Univ. of Patras, Greece [4]Heriot-Watt University, Edinburgh, UK [5]School of ECE, Georgia Institute of Technology, USA
paper 52	A Multi-Scale Deep Learning Attention-based Feature Method for Rolling Elements Bearing Fault Detection in Industrial Motor Drives Yannis L. Karnavas, S. Plakias, Ioannis D. Chasiotis Electrical Machines Laboratory, Dpt of Electrical & Computer Engineering, Democritus Univ. of Thrace, Greece
paper 63	iPONICS: IoT Monitoring and Control for Hydroponics K. Tatas[1], A. Al-Zoubi[1],A. Antoniou[2],D. Zolotareva[3] [1]Frederick Research Center and Frederick Univ, Cyprus [2]Adaptive Hydroponics Limited, Larnaca, Cyprus [3]Frederick University, Cyprus
paper 76	Experimental Attenuation Coefficient Estimation for FSO Links over Maritime Area During Summer Time G.A. Papavgeris[1], A.N. Stassinakis[1], H.E. Nistazakis[1], E.V. Chatzikontis[1], A.D. Tsigopoulos[2], V. Christofilakis[3] [1]Department of Physics, National and Kapodistrian University of Athens, Greece. [2]Hellenic Naval Academy, Piraeus, Greece [3]Physics Department, University of Ioannina, Greece
paper 90	On the Utilization of L-PAM Technique in Trasdermal Optical Wireless Links with Stochastic Pointing Errors for ABER Performance Estimation. G.K. Varotsos[1], H.E. Nistazakis[1], K.Aidinis[2,3], F.Jaber[3,4], M. Nasor[3,4], K.K. Mujeeb Rahman [3,4] [1]National and Kapodistrian Univ. of Athens, Greece. [2]Dpt of Electrical Engineering, Ajman University, UAE. [3]Center of Medical and Bio-allied Health Sciences Research, Ajman University, United Arab Emirates. [4]Dpt of Biomedical Engineering, Ajman Univ, UAE
paper 91	On the BER Performance of OOK FSO Links with Receivers' Diversity and Time Jitter over Strong Turbulence Channels P.J. Gripeos[1], H.E. Nistazakis[1], E. Roditi[1], G.D. Roumelas[1], G.S. Tombras[1], C.K. Volos[2] [1]National and Kapodistrian Univ of Athens, Greece [2]Aristotle Univ. of Thessaloniki, Greece.

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paper 94	Design of Unit Cells for Intelligent Reflection Surfaces Based on Transparent Materials. Savvas Chalkidis[1], Evangelos Vassos[2], Achilles D. Boursianis[1], Alexandros Feresidis[2], Sotirios K. Goudos[1] [1]ELEDIA@AUTH, School of Physics, Aristotle University of Thessaloniki, Greece [2]Electronic, Electrical and Systems Engineering, University of Birmingham, UK
paper 95	Towards an Analytical Model of Latency in Deflection Routing: A Stochastic Process Approach for Bufferless NoCs Konstantinos Tatas Department of Electrical and Computer Engineering and Informatics, Frederick University, Cyprus
paper 104	A NB-IoT based platform for smart irrigation in vineyard Aglaia Liopa-Tsakalidi[1], Vasileios Thomopoulos[2], Pantelis Barouchas[1], Angeliki Kavga[1], Achilles D. Boursianis[3], Sotirios K. Goudos[3] [1]Dpt of Agriculture, Univ. of Patras, Greece [2]Dpt of Computer Engineering, Univ. of Patras, Greece [3]Dpt of Physics, Aristotle Univ. of Thessaloniki, Greece
paper 114	A modern cloud based recycling system for smart cities Nikolaos Baras, Dimitris Ziouzios, Minas Dasygenis, Constantinos Tsanaktsidis University of Western Macedonia, Greece

Wednesday, July 7th

09:10-10:30 (GMT+03:00)	**Workshop on Emergent Memristive Devices, Circuits and Systems for Wave Computing.** **Chairs: Prof. G.Sirakoulis, Prof. D. Tsoukalas and Dr. A. Ascoli.**
paper 58	Unconventional Logic on Memristor-Based Oscillatory Medium Theodoros Panagiotis Chatzinikolaou[1], Iosif-Angelos Fyrigos[1], Vasileios Ntinas[1,3], Stavros Kitsios[2], Panagiotis Bousoulas[2], Michail-Antisthenis Tsompanas[1], Dimitris Tsoukalas[2] and Georgios Ch. Sirakoulis[1] [1]Department of Electrical and Computer Engineering, Democritus University of Thrace, Greece [2]Department of Applied Physics, National Technical University of Athens, Greece [3]Department of Electronics Engineering, Universitat Politecnica de Calatunya, Spain
paper 31	Control Strategies to Optimize Graph Coloring via M-CNNs with Locally-Active NbOx Memristors Alon Ascoli[1], Martin Weiher[1], Ronald Tetzlaff[1], Melanie Herzig[2], Stefan Slesazeck[2] and Thomas Mikolajick [2,3] [1]Institute of Circuits and Systems, Technische Universitat Dresden, Germany [2]Nano-electronic Materials Laboratory (NaMLab) gGmbH, Dresden, Germany [3]Institute of Semiconductors and Microsystems, Technische Universitat Dresden, Dresden, Germany
paper 53	Design Steps towards a MCU-based Instrumentation System for Memristor-based Crossbar Arrays Jose Cayo and Ioannis Vourkas Department of Electronic Engineering, Universidad Tecnica Federico Santa Maria, Valparaiso, Chile
paper 26	A Stochastic Switched Capacitor Memristor Emulator C. de Benito[1,2], O. Camps[1], M. M. Al Chawa[4], S. G. Stavrinides[3] and R. Picos[1,2]. [1]Universitat de les Illes Balears, Palma, Mallorca, Spain [2]Balearic Islands Health Inst., Palma, Mallorca, Spain [3]School of Science and Technology, International Hellenic University, Thessaloniki, Greece [4]Technische Universitat Dresden, Dresden, Germany
paper 28 poster presentation	A New Temperature-Based Model for the Reset Transition on ReRAM Memristive Devices. M. M. Al Chawa[1], R. Tetzlaff[1], S.G. Stavrinides[2], C. de Benito[3] and R. Picos[3] [1]Technische Universitat Dresden, Germany [2]International Hellenic University, Thessaloniki, Greece [3]Univ. de les Illes Balears, Palma de Mallorca, Spain

Wednesday, July 7th	
10:30-10:45 (GMT+03:00)	**Short Break**
10:45-11:45 (GMT+03:00)	**Keynote Speech 4** **Robust Perception for Autonomous Robot Systems** **Speaker: Prof . Lazaros Nalpantidis** **Chair: Dr. C.L. Sotiropoulou**
11:45-12:00 (GMT+03:00)	**Short Break**
12:00-14:05 (GMT+03:00)	**Special Session on Machine Learning Applications in Communications and Electronics.** **Chairs: Prof. S.Goudos, Prof. M. Salucci, Prof. P. Sarigiannidis, Prof. S.Wan**
paper 39	Real-Time CSI-Based Wireless Gesture Recognition for Human-Machine Interaction Alessandro Polo[1], Marco Salucci[1], Stefano Verzura[2], Zhenkun Zhou[3], and Andrea Massa [1,4,5] [1]CNIT - "University of Trento" Research Unit, Italy [2]Huawei Technologies, Segrate, Italy [3]Huawei Technologies, Shenzhen, China [4]ELEDIA Research Center (ELEDIA@UESTC – UESTC), Chengdu, China [5]ELEDIA Research Center (ELEDIA@TSINGHUA – Tsinghua University), Beijing, China
paper 42	Comparing Machine Learning Methods for Air-to-Ground Path Loss Prediction George Vergos[1], Sotirios P. Sotiroudis[1], Georgia Athanasiadou[2], George V. Tsoulos[2], Sotirios K. Goudos[3] [1]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [2]Informatics and Telecommunications Dpt, Univ. of Peloponnese, Tripolis, Greece [3]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece
paper 78	Link Blockage Modelling for Channel State Prediction in Higher Frequencies Using Deep Learning Shreya K. Chari[1,2], Georgios P. Koudouridis[2] [1]KTH Royal Institute of Technology, Sweden [2]Huawei Technologies Sweden, Stockholm Research Centre

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paper 86	Unsupervised Machine Learning in 6G Networks - State-of-the-art and Future Trends V. P. Rekkas[1], S. Sotiroudis[1], P. Sarigiannidis[2], G.K. Karagiannidis[3], S. K. Goudos[1] [1]ELEDIA@AUTH, School of Physics, Aristotle University of Thessaloniki, Greece [2]Department of Informatics and Telecommunications Engineering, University of Western Macedonia, Greece [3]School of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Greece
paper 38	On the Synthesis of Feasible Sources for Next Generation Smart EM Environments Marco Salucci[1], Arianna Benoni[1], Pietro Da Rù[1], Paolo Rocca[1,2] and Andrea Massa [1,3,4] [1]CNIT - "University of Trento" Research Unit, Italy [2]ELEDIA Research Center (ELEDIA@XIDIAN – Xidian University), Xi'an, China [3]ELEDIA Research Center (ELEDIA@UESTC – UESTC), Chengdu, China [4]ELEDIA Research Center (ELEDIA@TSINGHUA – Tsinghua University), Beijing, China
paper 16 **poster presentation**	Darknet Traffic Classification using Machine Learning Techniques Lazaros Alexios Iliadis, Theodoros Kaifas Physics Dpt, Aristotle Univ. of Thessaloniki, Greece
paper 80 **poster presentation**	The contribution of Machine Learning and Eye-tracking technology in Autism Spectrum Disorder research: A Review Study Konstantinos-Filippos Kollias[1], Christine K. Syriopoulou-Delli[2], Panagiotis Sarigiannidis[2], George F. Fragulis[2] [1]Dpt of Electrical and Computer Engineering, Univ. of Western Macedonia, Hellas [2]Department of Educational and Social Policy, Univ. of Macedonia, Hellas
paper 81 **poster presentation**	Fish Morphological Feature Recognition Based on Deep Learning Techniques Nikos Petrellis Electrical and Computer Engineering Dpt, University of the Peloponnese, Patras, Greece

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paper 23 **poster presentation**	Efficient Utilization of FPGA Multipliers for Convolutional Neural Networks M. A. Boulasikis, M. Birbas, N. Tsafas, N. Kanakaris Dpt of Electrical and Computer Engineering, Univ. of Patras, Greece
paper 84 **poster presentation**	A Survey on Hardware Failure Prediction of Servers Using Machine Learning and Deep Learning N. Georgoulopoulos[1], A. Hatzopoulos[1], K. Karamitsios[2], I.M. Tabakis[2], K. Kotrotsios[2], A. I. Metsai[2] [1]Dpt. of Electrical and Computer Engineering, Aristotle University of Thessaloniki, Greece [2]My Company Projects O.E., Thessaloniki, Greece
14:05-15:00 (GMT+03:00)	**Break**
15:00-16:33 (GMT+03:00)	**Workshop on Non-linear Circuits and Systems** **Chairs: Prof. Ch. Volos, Dr. L. Moysis**
paper 18	Sensitive Chaotic Circuits with Coupled Inductances T.Karimov[1], O.Druzhina[2], A.Karimov[2], A.Tutueva[1], D. Butusov[1] [1]Youth Research Institute, Saint-Petersburg Electrotechnical University "LETI", St. Petersburg, Russia [2]Dpt of Computer-Aided Design, Saint-Petersburg Electrotechnical University "LETI", Russia
paper 40	Emulating a Chaotic Economic Model By Using A Microcontroller A. Girgolas[1], Ch. Volos[1], A. Gakoumis[2], S. Stavrinides[3], Th. Karakasidis[4] and I. Stouboulos[1] [1]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [2]Dpt of Informatics & Electronics Engineering, International Hellenic University,Thessaloniki, Greece [3]School of Science and Technology, International Hellenic University, Thessaloniki, Greece [4]Dpt of Physics, University of Thessaly, Greece
paper 44	Medical data encryption based on modified sinusoidal 1D chaotic map and its microcontroller implementation. A. Iatropoulos[1], L. Moysis[2], A. Giakoumis[1], Ch. Volos[1], Adel Ouannas[3] and S. Goudos[1]. [1]Department of Information and Electronic Engineering, International Hellenic University, Thessaloniki, Greece [2]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [3]Dpt of Mathematics and Computer Science, University of Larbi Ben Mhidi, Algeria

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paper 68	Hardware Design and Implementation of a Wireless Chaotic Text Encryption Scheme L. Moysis[1], A. Giakoumis[2], A. Iatropoulos[2], Ch. Volos[1], H. Nistazakis[3] and I. Stoumpoulos.[1] [1]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [2]Department of Information and Electronic Engineering, International Hellenic University, Thessaloniki, Greece [3]Faculty of Physics, National and Kapodistrian University of Athens, Greece.
paper 34 **poster presentation**	A 2D Discrete Chaotic Memristive Map and Its Application in Robot's Path Planning. Eleftherios Petavratzis[1],Christos Volos[1], Adel Ouannas[2], Hector Nistazakis[3], Kimon Valavanis[4] and Ioannis Stouboulos[1] [1]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [2]Department of Mathematics and Computer Science, University of Larbi Ben M'hidi, Algeria [3]Faculty of Physics, National and Kapodistrian University of Athens, Greece [4]Department of Electrical and Computer Engineering, University of Denver, USA
paper 51 **poster presentation**	Universal Cellular Computing on the Edge of Chaos Angela Slavova and Ventsislav Ignatov Bulgarian Academy of Sciences, Bulgaria
paper 92 **poster presentation**	An ARM-FPGA-based Co-Design for Implementing Chaotic Systems Daniel Clemente-Lopez[1], Lazaros Moysis[2], Christos Volos[2], Jesus Manuel Munoz-Pacheco[1], Sajad Jafari[3], Ioannis Stouboulos[1] [1]Faculty of Electronic Sciences, Autonomous University of Puebla, Mexico [2]Physics Dpt, Aristotle Univ. of Thessaloniki, Greece [3]Health Technology Research Institute, Amirkabir University of Technology, Tehran, Iran
16:35-17:55 (GMT+03:00)	**Special Session on Wireless Sensor System for Leak Detection and Localization in Pipelines (ESTHISIS project)** **Chairs: Prof. S. Nikolaidis, Prof. G.O. Glentis and Dr. Ch. Spandonidis**

Wednesday, July 7th	
paper 55	Performance assessment of correlation methods for the velocity estimation of vibro-acoustic signals propagating in fluid-filled pipelines Kostas Angelopoulos and George Othon Glentis Dept. of Informatics and Telecommunications, University of Peloponnese, Tripoli, Greece
paper 69	Acoustic leak localization method based on signal segmentation and statistical analysis Georgios-Panagiotis Kousiopoulos, Nikolaos Karagiorgos, Dimitrios Kampelopoulos, Vasileios Konstantakos and Spyridon Nikolaidis Physics Dpt, Aristotle Univ. of Thessaloniki, Greece
paper 99	Applying One Class Classification for Leak Detection in Noisy Industrial Pipelines Dimitrios Kampelopoulos, George P. Kousiopoulos, Nikolaos Karagiorgos, Vasileios Konstantakos, Sotirios K. Goudos and Spyridon Nikolaidis Physics Dpt, Aristotle Univ. of Thessaloniki, Greece
paper 74	Autonomous low-cost Wireless Sensor platform for Leakage Detection in Oil and Gas Pipes Spandonidis C. Christos, Giannopoulos Fotis, Galiatsatos Nektarios, Reppas Dimitris, Petsa Areti and Spyropoulos Dimitrios Prisma Electronics, R&D department, Alexandroupolis, Greece
paper 98 **poster presentation**	Development of an IoT Early Warning Platform for Augmented Decision Support in Oil & Gas Spandonidis C. Christos, Galiatsatos Nektarios, Giannopoulos Fotios, Demagos Nikolaos, Papadopoulos Panagiotis, Petsa Areti Prisma Electronics, R&D department, Alexandroupolis, Greece
17:55-18:10 (GMT+03:00)	**Short Break**
18:10-18:30 (GMT+03:00)	**Awards - Closing Ceremony**

At a glance	
GMT+03:00	**Monday, 5 July 2021**
09:00 – 09:30	Opening
09:30 – 11:00	Session 1 : Analog RF and mixed signal circuits
11:00 – 11:15	Short Break
11:15 – 12:15	Keynote Speech 1 : Memristor Cellular Nonlinear Networks: Computing by Complexity
12:15 – 12:30	Short Break
12:30 – 14:00	Session 2 : Sensors and systems
14:00 – 15:00	Break
15:00 – 16:48	Session 3 : Digital circuits
16:48 – 17:00	Short Break
17:00 – 18:40	Poster Session 1
GMT+03:00	**Tuesday, 6 July 2021**
09:00 – 10:48	Session 4 : Communication and network systems
10:48 – 11:00	Short Break
11:00 – 12:00	Keynote Speech 2 : Building a Smart EM Environment for New Communication Systems and Application
12:00 – 12:15	Short Break
12:15 – 13:45	Session 5 : Systems and applications
13:45 – 14:45	Break
14:45 – 15:45	Keynote Speech 3 : Next Generation Internet of Things: Requirements, Applications & Paradigms
15:45 – 16:00	Short Break
16:00 – 17:30	Session 6 : Power electronics, control systems and signal analysis
17:30 – 19:01	Poster Session 2
GMT+03:00	**Wednesday, 7 July**
09:10 – 10:30	Workshop on Emergent Memristive Devices, Circuits and Systems for Wave Computing
10:30 – 10:45	Short Break
10:45 – 11:45	Keynote Speech 4 : Robust Perception for Autonomous Robot Systems
11:45 – 12:00	Short Break
12:00 – 14:05	Special Session on Machine Learning Applications in Communications and Electronics
14:05 – 15:00	Break
15:00 – 16:33	Workshop on Non-linear circuits and Systems
16:35 – 17:55	Special Session on Wireless Sensor System for Leak Detection and Localization in Pipelines (ESTHISIS project)
17:55 – 18:10	Short Break
18:10 – 18:30	Awards – Closing Ceremony