

19th IEEE International Conference on
Distributed Computing in Smart Systems
and the Internet of Things

DCOSS-IoT 2023

PROGRAM



June 19-21, 2023

Coral Bay, Pafos, Cyprus





Message from Program Chairs and the Steering Committee Chair

The Nineteenth Annual International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT) is held in Coral Bay, Pafos, Cyprus on 19-21 June, 2023. In the last few years, we have witnessed significant growth in the use of distributed sensor systems in a number of application areas, ranging from smart cities to manufacturing and remote sensing. In order for smart sensor systems to truly become useful and pervasive, there is a need to address a number of research challenges, including the tight integration of sensing and machine intelligence, reliable and efficient networking, interoperability and scalability, dependable autonomy, interaction with humans, and important aspects of security, privacy and trust. DCOSS has been focusing on the above information processing issues for distributed sensor systems, covering models, algorithms, architectures, deployment tools, and novel applications. Starting from the 2023 event, DCOSS is broadening its scope beyond sensor networks to smart systems in general as well as the Internet of Things (IoT). The updated name is “Distributed Computing in Smart Systems and the Internet of Things” (DCOSS-IoT).

The main event of DCOSS-IoT 2023 includes a high-quality technical program consisting of keynotes, research papers, and a poster session. We received 86 full paper submissions. Each submitted paper was reviewed by at least three experts in the field; most papers received four reviews. After in-depth online discussions, we accepted 20 full papers, 12 short papers and 7 poster papers. In addition, 2 poster papers and 1 demo were accepted from an open call. Specifically, the program covers important aspects of distributed computing in smart systems and IoT, such as machine learning and artificial intelligence, novel applications and deployments, scalability and resource allocation, communications and security, drones and autonomous systems, and RF sensing. Two keynote talks are delivered by Prof. David Kotz, Dartmouth University, and Prof. Andrew Markham, Oxford University. In addition, DCOSS-IoT 2023 includes an interesting set of 10 focused workshops, which represent an important part of the event as a whole. We believe the technical program will provide an exciting forum for researchers and practitioners to exchange cutting-edge ideas in distributed sensor systems.

The conference would not be successful without the hard work of many volunteers. First, we wish to particularly thank the Local Chairs (Savvas Chatzichristofis, Zinon Zinonos, Vasos Vassiliou, Michael Georgiades) for taking care of the many details of successfully organizing the conference in Pafos. We appreciate and recognize the key role of the Neapolis University of Paphos (NUP), the local organizer institution. Also, we thank the Publicity Chairs (Viviana Arrigoni, Suranga Seneviratne, Vijay Shah, Lei Shu) for their efforts in attracting a good number of submissions around the world. We sincerely thank the Technical Program Committee members for their high-quality reviews. Also, we are grateful to the Chairs of the 10 specialized Workshops, the Poster Chairs (Jennifer Simonjan and Chrysostomos Chrysostomou), Workshop Chairs (Enrico Natalizio, Eirini Eleni Tsiropoulou), Proceedings Chair (Marios Angelopoulos), Registrations and Visa Letter Chair (Gabriel Filios), Sponsorships Chair (Zinon Zinonos), and Web Chairs (Markantonatos Dimitrios Aimilianos, Skondras Georgios and Stefanos Panagiotou) for their dedication and hard work toward the success of DCOSS-IoT 2023. We wish to also thank the various sponsors and supporters of DCOSS-IoT 2023: the Technology Innovation Institute (TII) and the Neapolis University of Pafos (NUP).

Finally, we are grateful to the authors for submitting their fine work to DCOSS-IoT 2023 and to all the participants for their attendance.

Program Co-Chairs

Salil Kanhere, Simone Silvestri, Olga Saukh

Steering Committee Chair

Sotiris Nikolettseas

Message from the Workshop Chairs

Workshops have historically constituted an essential part of the technical program of the annual International Conference on Distributed Computing in Sensor Systems (DCOSS-IoT). The 2023 edition makes no exception and includes a total of ten exciting workshops focusing on a wide spectrum of topics around the umbrella of distributed computing, such as industrial Internet of Things applications, UAV and robot networks, real-life modeling in 5G/6G networks, urban computing, artificial intelligence in distributed computing, and wireless communications and networking in extreme environments.

Workshops' programs will include a mix of regular papers, invited talks, and keynote presentations to encourage the participation of attendees in active discussion. The accepted papers will appear in the DCOSS-IoT 2023 Proceedings as well as in IEEE Xplore.

We hope DCOSS attendees will enjoy and appreciate this year exciting and rich workshop program.

The Workshops Chairs:

Enrico Natalizio, Technology Innovation Institute, UAE
Eirini Eleni Tsiropoulou, University of New Mexico, USA

List of Workshops and key organizers:

Wi-DroIT 2023 (5th International Workshop on Wireless Sensors and Drones in Internet of Things)

Federico Corò: University of Perugia, Italy
Panagiotis Kolios: KIOS Research and Innovation Center of Excellence, University of Cyprus

IoT15 2023 (5th International Workshop on IoT Applications and Industry 5.0)

Thomas Lagkas, International Hellenic University, Greece
Panagiotis Sarigiannidis, University of Western Macedonia, Greece
John Soldatos, Netcompany-Intrasoft, Luxemburg
Barbara Villarini, University of Westminster, UK

SmaCE 2023 (5th IEEE International Workshop on Workshop on Smart Circular Economy)

Marios Angelopoulos, Bournemouth University, UK
Giorgos Demetriou, École des Ponts Business School, France
Vasileios Gerogiannis, University of Thessaly, Greece
Vasilis Katos, Bournemouth University, UK
David Langley, University of Groningen & TNO, the Netherlands
Sotiris Nikoletseas, University of Patras, Greece

REFRESH 2023 (4th International Workshop on Real-life modeling in 5G/6G networks)

Eirini Eleni Tsiropoulou, University of New Mexico, USA

Symeon Papavassiliou, National Technical University of Athens, Greece

ISIoT 2023 (5th International Workshop on Intelligent Systems for the Internet of Things)

Vasos Vassiliou, University of Cyprus and CYENS Research Center

Savvas Chatzichristofis, Neapolis University Pafos

Michael Georgiades, Neapolis University Pafos

Zinon Zinonos, Smart City Manager, Municipality of Pafos

UrbCom 2023 (5th International Workshop on Urban Computing)

Leandro A. Villas, University of Campinas, Brazil

Thiago H. Silva, Federal University of Technology, Brazil

Daniel L. Guidoni, Federal University of Ouro Preto, Brazil

Geraldo P. R. Filho, State University of Southwest Bahia, Brazil

Vinicius F. S. Mota, Federal University of Espirito Santo, Brazil

LS-NoT 2023 (1st International Workshop on Long and Short Range Wireless Technologies Applied to IoT for Networks of Tomorrow)

Jana Koteich, Inria, France

Nina Santi, Inria, France

Damien Wohwe Sambo, Inria, France

SecRIoT 2023 (4th International Workshop on Security and Reliability of IoT)

Athanasios Kakarountas, University of Thessaly, Greece

Vasileios Vlachos, University of Thessaly, Greece

Periklis Chatzimisios, International Hellenic University, Greece

Leandros Maglaras, Napier University, Scotland

DISCOLI 2023 (2nd International Workshop on Distributed Collective Intelligence)

Roberto Casadei, Alma Mater Studiorum - Università di Bologna, Italy

Noel Crespi, Institute Mines-Telecom, Institut Polytechnique de Paris, France

Claudio Savaglio, Università della Calabria, Italy

Christos Tsigkanos, University of Bern, Switzerland

TI 2023 (1st International Workshop on Next Generation IoT and AI systems for Trusted, Human-Centered Intelligence)

Pedro Maló, NOVA School of Science and Technology, Portugal

Luís Lino Ferreira, Instituto Superior de Engenharia do Porto, Portugal

Filipe Moutinho, NOVA School of Science and Technology, Portugal

Martin Serrano, University of Galway, Ireland

João Rosas, NOVA School of Science and Technology, Portugal

Pavlos Kranas, LeanXcale, Spain

Program at a glance

| | Monday 19/6/2023 | | Tuesday 20/6/2023 | | Wednesday 21/6/2023 | |
|-----------------|---|--|---|--------------------------------------|----------------------------|---|
| | Workshops | Main Event | Workshops | Main Event | Workshops | Main Event |
| 8:30 - 9:00 | | Registration | | Registration | | Registration |
| 9:00 - 9:30 | | Welcome and Introduction | | | | Session 5 |
| 9:30 - 10:00 | IoTIS 2023 Emerging Topics in IoT | Keynote 1 (David Kotz) | TI 2023 UrbCom 2023 | Keynote 2 (Andrew Markham) | ISIoT 2023 DISCOLI 2023 | Communications and Security |
| 10:00 - 10:30 | | Coffee break | | Coffee break | | Coffee break |
| 11:00 - 11:30 | | Session 1 | | Session 3 | | Session 6 |
| 11:30 - 12:00 | | Machine Learning and Artificial Intelligence | | Applications and Deployment | | Drones and Autonomous Systems |
| 12:00 - 12:55 | | | | | | |
| 13:00 - 13:30 | | Lunch | | Lunch | | Lunch |
| 13:30 - 14:00 | | | | | | |
| 14:00 - 14:30 | IoTIS 2023 Emerging Topics in IoT SecRIoT 2023 | Session 2 | TI 2023 WIDroit 2023 | Session 4 | ISIoT 2023 | Session 7 |
| 14:30 - 15:00 | | Best Paper Candidates | | Scalability and Resource Allocation | | RF Sensing |
| 15:00 - 15:15 | | Coffee break | | Coffee break | | Closing |
| 15:15 - 15:45 | | Oral Poster Presentations | | Poster and Demo Session at the lobby | | Excursion (Start 16:30) (Pafos Mosaics, Tombs of the Kings, Castle, Old Town) |
| 15:45 - 16:00 | | | | | | |
| 16:00 - 16:30 | | | | | | |
| 16:30 - 17:00 | | | | | | |
| 17:00 - 17:15 | | | | | | |
| 17:15 - 17:30 | | | | | | |
| 17:30 - 17:45 | | | | | | |
| 17:45 - 18:00 | | | | | | |
| Post conference | Welcome Reception (19:00 - 20:00) at pool area of Coral Hotel | | Banquet-Cyprus night (20:00 - 22:00) at Armonia restaurant of Coral Hotel | | | |

Keynote Talks

“SPLICE: Securing the lifecycle of Smart Homes”

Monday, June 19, 2023

Prof. David Kotz, Dartmouth College, USA



“Towards the Internet of (Wild) Things”

Tuesday, June 20, 2023

Prof. Andrew Markham, University of Oxford, UK



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|-------------|---|
| 08.30-09.00 | Registration opens |
| 09.00-09.30 | Welcome and Introduction (SC Chair, Local Chairs, TPC Chairs, DCOSS 2024 in Abu Dhabi) |
| 09.30-10.30 | Keynote Talk: "SPICE: Securing the lifecycle of Smart Homes" <i>Prof. David Kotz, Dartmouth College, USA</i> |
| 10.30-11.00 | Coffee Break |
| 11.00-12.55 | <p>Session I: Machine Learning and Artificial Intelligence (Chair: Somali Chaterji, Purdue University, USA)</p> <ul style="list-style-type: none"> • Resource Aware Client Selection for Federated Learning in IoT Scenarios (Full) <i>Filipe Maciel (Federal University of Ceará and State University of Campinas, Brazil); Allan M. de Souza, Luiz F. Bittencourt, Leandro A. Villas (State University of Campinas, Brazil)</i> • SonAIR: Real-Time Deep Learning For Underwater Acoustic Spectrum Sensing and Classification (Full) <i>Daniel Uvaydov, Deniz Unal, Kerem Enhos, Emre Can Demirors, Tommaso Melodia (Northeastern University, USA)</i> • FedPredict: Combining Global and Local Parameters in the Prediction Step of Federated Learning (Full) <i>Cláudio Gustavo Santos Capanema (Universidade Federal de Minas Gerais, Brazil); Allan Mariano de Souza (Universidade Estadual de Campinas, Brazil); Fabrício Aguiar Silva (Universidade Federal de Viçosa, Brazil); Leandro Aparecido Villas (Universidade Estadual de Campinas, Brazil); Antonio Alfredo Ferreira Loureiro (Universidade Federal de Minas Gerais, Brazil)</i> • Acconotate: Exploiting Acoustic Changes for Automatic Annotation of Inertial Data at the Source (Full) <i>Soumyajit Chatterjee, Arun Singh, Bivas Mitra, Sandip Chakraborty (Indian Institute of Technology, Kharagpur, India)</i> • Multiple early-exits strategy for distributing deep neural network inference (Short) <i>Marion Sbai, Niki Trigoni, Andrew Markham (University of Oxford, UK)</i> |
| 13.00-14.00 | Lunch Break |
| 14.00-15.15 | <p>Session II: Best Paper Candidates (Chair: Simone Silvestri, University of Kentucky, USA)</p> <ul style="list-style-type: none"> • SPADE: Secure Periodic Advertising using Coded Time-Channel Rendezvous for BLE Audio (Full) <i>Dokyun Ryoo, Yongjae Yoo (Seoul National University, South Korea); Jeongyeup Paek (Chung-Ang University, South Korea); Saewoong Bahk (Seoul National University, South Korea)</i> |

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| | <ul style="list-style-type: none"> • BmmW: A DNN-based Joint BLE and mmWave Radar System for Accurate 3D Localization (Full) <i>Peizheng Li, Jagdeep Singh (Toshiba Europe Ltd., UK); Han Cui (University of Bristol, UK); Carlo Alberto Boano (Graz University of Technology, Austria)</i> • Unsupervised Spatio-Temporal Anomalous Thermal Behavior Monitoring of Inside-Built Environments (Full) <i>Naima Khan (University of Maryland Baltimore County, USA); Md Abdullah Al Hafiz Khan (Kennesaw State University, USA); Nirmalya Roy (University of Maryland Baltimore County, USA)</i> |
| 15.15-15.45 | Coffee Break |
| 15.45-16.30 | <p style="text-align: center;">Oral Poster Presentations (Chair: Jennifer Simonjan, Technology Innovation Institute, UAE)</p> <ul style="list-style-type: none"> • Resolving the Decreased Rank Attack in RPL's IoT Networks <i>Baraq Ghaleb, Ahmed Al-Dubai, Amir Hussain, Jawad Ahmad, Imed Romdhani, Zakwan Jaroucheh (Edinburgh Napier University, UK)</i> • Towards Data Dissemination Policy Prediction for Constrained Environments Using Analytics <i>Loic Guegan, Issam Rais, Otto Anshus (UiT The Arctic University of Norway, Norway)</i> • EDICT: A Simulation Tool for Performance Metrics Datasets in IoT Environments <i>Houssam Hajj Hassan, Georgios Bouloukakis, Denis Conan (Telecom SudParis, Institut Polytechnique de Paris, France), Ajay Kattepur (Ericsson AI Research, India), Mahdi Trabolsi (Telecom SudParis, Institut Polytechnique de Paris, France and Universite' Jean Monnet, Sainte-E'tienne, France), Nikolaos Papadakis (Institute of Computer Science, Foundation for Research and Technology – Hellas), Djamel Belaid (Telecom SudParis, Institut Polytechnique de Paris, France), Kostas Magoutis (Institute of Computer Science, Foundation for Research and Technology – Hellas and Computer Science Department, University of Crete, Greece)</i> • A Holistic IoT-Enabled Approach for Indoor Air Quality Control <i>Fotios Kalioras (University of Patras, Greece), Gabriel Filios (University of Patras, Greece and Computer Technology Institute and Press "Diophantus", Greece), Stylianos Karatzas (University of Patras, Greece), Sotiris Nikolettseas (University of Patras, Greece)</i> • Unsupervised and Condition Invariant Anomaly Detection for The Constrained Edge <i>Chandrakanth R Kancharla, Dries Vanoost, Jens Vankeirsbilck, Jeroen Boydens, Hans Hallez (KU Leuven, Belgium)</i> • Drone Detection and Localization using Low-Cost Microphone Arrays and Convolutional Neural Networks <i>Peteris Racinskis, Janis Arents, Modris Greitans (Institute of Electronics and Computer Science, Latvia)</i> • Smart Shoe for Fall Detection Application <i>Md Shohanoor Rahman, Ali Nikoukar, Mesut Gunes (Otto-von-Guericke-University Magdeburg, Germany)</i> |

- **Towards Automated HVAC Control in Fibre Composite Manufacturing**
Jan Schlichter, Roman Ficht, Lars Wolf (TU Braunschweig)
- **Insights from Executing TinyML Models on Smartphones and Microcontrollers**
Harman M Singh, Shrishailya A Agashe (BITS Pilani, Goa, India); Shreyans Jain (Qualcomm India); Sravan Danda, Aditya Challa, Surjya Ghosh, Sougata Sen (BITS Pilani Goa, India)
- **DNN task allocation for edge-aided IoT**
Wanli Yu (University of Bremen, Germany); Yanqiu Huang (University of Twente, Netherlands); Ardalan Najafi, Yarib Nevarez, Jinming Sun, Alberto Garcia-Ortiz (University of Bremen, Germany)

**19.00-
20.00**

Welcome Reception
(at pool area of Coral Hotel)

08.30-
09.30

Registration opens

09.00-
09.30**Keynote Talk: "Towards the Internet of (Wild) Things"***Prof. Andrew Markham, University of Oxford, UK*10.30-
11.00

Coffee Break

11.00-
12.55**Session III: Applications and Deployment***(Chair: Zakwan Jaroucheh, Edinburgh Napier University, UK)*

- **Utilizing Natural Thermal Gradients as Micro Energy Sources for Wireless Sensor Networks (Full)**
Sven Pullwitt, Lars Wolf (TU Braunschweig, Germany)
- **Terrain Type Detection for Smart Equine Gait Analysis Systems using Inertial Sensors and Machine Learning (Full)**
Jeanne I.M. Parmentier (Utrecht University & University of Twente, Netherlands); Filipe M. Serra Bragança (Utrecht University, Netherlands); Elin Hernlund (Swedish University of Agricultural Sciences, Sweden); Berend Jan van der Zwaag (University of Twente, Netherlands)
- **OcAPO: Occupancy-Aware, PDC Control for Open-Plan, Shared Workspaces (Full)**
Anuradha Ravi, Archan Misra (Singapore Management University, Singapore)
- **emsReACT: A Real-Time Interactive Cognitive Assistant for Cardiac Arrest Training in Emergency Medical Services (Full)**
M Arif Rahman, Leon Jia, Eimara Mirza, Sarah Masud Preum, Homa Alemzadeh, Ronald D. Williams, John A. Stankovic (University of Virginia, USA)
- **Detecting Writing Micro-Events using Motion Sensors in Smartwatches (Short)**
Sonia Soubam (IIT Delhi, India); Dipyaman Banerjee (Airtel Digital, India); Vinayak Naik (BITS Pilani, Goa, India)

13.00-
14.00

Lunch Break

14.00-
15.50**Session IV: Scalability and Resource Allocation***(Chair: Yanqiu Huang, University of Twente, Netherlands)*

- **Hybrid Genetic Algorithm and Simulated Annealing for Task Allocation with Data Security (Full)**
Wanli Yu (University of Bremen, Germany); Yanqiu Huang (University of Twente, Netherlands); Yuan Yang (Southeast University, China); Alberto Garcia-Ortiz (University of Bremen, Germany)

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| | <ul style="list-style-type: none"> • An Efficient Approach for Merging Multidimensional Blockchains in Mobile IoT (Full) <i>Hussein Zangoti, Niki Pissinou (Florida International University, USA); Charles A Kamhoua (US Army Research Laboratory, Network Security Branch, USA)</i> • QoS Aware Slice Resource Management using Deep Reinforcement Learning in IoT Networks (Short) <i>Kamran Zia, Alessandro Chiumento, Paul Havinga (University of Twente, Netherlands); Roberto Riggio (Polytechnic University of Marche, Italy); Yanqiu Huang (University of Twente, Netherlands)</i> • Joint Optimization of Service Migration and Resource Management for Vehicular Edge Computing (Short) <i>Dapeng Lan, Amir Taherkordi (University of Oslo, Norway); Lei Liu (Xidian University, China); Frank Eliassen (University of Oslo, China); Xiaoming Yuan (Northeastern University, China)</i> • EDICT: Simulation of Edge Interactions across IoT-enhanced Environments (Short) <i>Houssam Hajj Hassan (Télécom SudParis, France); Georgios Bouloukakis (Télécom SudParis, France); Ajay Kattepur (Ericsson Research, India); Denis Conan, Djamel Belaïd (Télécom SudParis, France)</i> • Bioinspired Dynamic Spectrum Management in 3D Networks (Short) <i>Aisha B Rahman, Jordan Patrizi (University of New Mexico, USA); Panagiotis Charatsaris (National Technical University of Athens, Greece); Eirini Eleni Tsiropoulou (University of New Mexico, USA); Symeon Papavassiliou (National Technical University of Athens, Greece)</i> |
| 15.50-16.10 | Coffee Break |
| 15.50-17.15 | Poster and Demo Session The session includes the presentation of the physical posters in the lobby area, where poster authors will be available for attendees to discuss and interact with. (Refer to the poster list in Monday’s session “Oral Poster Presentations”) |
| 20.00-22.00 | Conference Dinner (at Armonia restaurant of Coral Hotel) |

08.30-09.00

Registration opens

09.00-10.30

Session V: Communications and Security

(Chair: Lars Wolf, Technische Universität Braunschweig, Germany)

- **A Scalable and Cost-efficient Antenna Testbed using FPGA-Server Compound Structures for Prototyping 6G Applications (Full)**
Marc Neu, Christian Karle, Benjamin Nuss (Karlsruhe Institut of Technology, Germany); Patrick Groeschel (Friedrich-Alexander-Universitaet, Germany); Juergen Becker (Karlsruhe Institut of Technology, Germany)
- **RIC3: Reliability Improvement in UWB Networks Using Enhanced CCA and Complex Channels (Full)**
Alireza Ansaripour, Aryo Yarahmadi, Milad Heydariaan, Omprakash Gnawali (University of Houston, USA)
- **TSCH meets BLE: Routed Mesh Communication over BLE (Full)**
Laura Harms, Olaf Landsiedel (Kiel University, Germany and Chalmers University of Technology, Sweden)
- **Generative Adversarial Networks-Driven Cyber Threat Intelligence Detection Framework for Securing Internet of Things (Short)**
Mohamed Amine Ferrag (Technology Innovation Institute, UAE); Djallel Hamouda (Guelma University, Algeria); Merouane Debbah (Technology Innovation Institute, UAE); Leandros Maglaras (Edinburgh Napier University, UK); Abderrahmane Lakas (United Arab Emirates University, UAE)

10.30-11.00

Coffee Break

11.00-12.35

Session VI: Drones and Autonomous Systems

(Chair: Enrico Natalizio, Technology Innovation Institute, UAE)

- **Flexible Computation Offloading at the Edge for Autonomous Drones with Uncertain Flight Times (Full)**
Giorgos Polychronis, Spyros Lalis (University of Thessaly, Greece)
- **Vega: Drone-based Multi-Altitude Target Detection for Autonomous Surveillance (Full)**
Akhil Bandrupalli (Purdue University, USA); Sarthak Jain (Los Gatos High School, USA); Akash Melachuri, Joe Pappas, Somali Chaterji (Purdue University, USA)
- **Firefly: Localizing Drones with Visible Light Communication and Inertial Sensors (Short)**
Ricardo Ampudia (University of Twente, Netherlands); Talia Xu (TU Delft, Netherlands); Yanqiu Huang (University of Twente, Netherlands); Marco Zuniga (TU Delft, Netherlands)
- **Holistic Path Planning for Multi-Drone Data Collection (Short)**
Jonathan Diller, Peter Hall, Qi Han (Colorado School of Mines, USA)

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| | <ul style="list-style-type: none"> • Distributed Service Discovery over Heterogeneous Robotic Systems-of-Systems (Short) <i>Leonardo Montecchiari, Angelo Trotta, Lorenzo Gigli (University of Bologna, Italy); Lorenzo Bellone (Technology Innovation Institute, UAE); Marco Di Felice (University of Bologna, Italy); Enrico Natalizio (Technology Innovation Institute, UAE)</i> |
| 12.40-13.40 | Lunch |
| | <p style="text-align: center;">Session VII: RF Sensing <i>(Chair: Utz Roedig, University College Cork, Ireland)</i></p> <ul style="list-style-type: none"> • Exploring the Impact of Locations and Activities in Person-wise Data Mismatch in CSI-based HAR (Full) <i>Nikita Sharma, Duc V. Le, L.M.A. Braakman-Jansen (University of Twente, Netherlands); Jan Hendrik Croockewit (NEDAP N.V., Netherlands); Lisette van Gemert-Pijnen, Paul Havinga (University of Twente, Netherlands)</i> • A Long-Term Study Of mmWave Sensing In An Outdoor Urban Scenario Weizheng (Full) <i>Wang, Girish Vaidya, Anup Bhattacharjee, Francesco Fioranelli, Marco Zuniga (TU Delft, Netherlands)</i> • Identification and Classification of Electronic Devices using Harmonic Radar (Short) <i>Beatrice Perez, Timothy J. Pierson (Dartmouth College, USA); Gregory Mazzaro (The Citadel, The Military College of SC, USA); David Kotz (Dartmouth College, USA)</i> • Enabling Ubiquitous Occupancy Detection in Smart Buildings: A WiFi FTM-based Approach (Short) <i>Wenpeng Wang, Fateme Nikseresht, Viswajith Govinda Rajan, Jiechao Gao, Brad Campbell (University of Virginia, USA)</i> |
| 13.40-15.00 | |
| 15.00-15.15 | Closing Remarks |
| 16.30 | Excursion (Pafos Mosaics, Tombs of the Kings, Castle, Old Town) |

Workshops/Special Session Schedule

Monday, June 19, 2023

- **IoT15 (5th International Workshop on IoT Applications and Industry 5.0)**
Chairs: Thomas Lagkas, Panagiotis Sarigiannidis, John Soldatos, Barbara Villarini
- **SecRIoT (4th International Workshop on Security and Reliability of IoT Systems)**
Chairs: Athanasios Kakarountas, Vasileios Vlachos, Periklis Chatzimisios, Leandros Maglaras
- **Emerging Topics in IoT – Joint Event**
 - **SmaCE (5th IEEE International Workshop on Smart Circular Economy)**
Chairs: Marios Angelopoulos, Giorgos Demetriou, Vasileios Gerogiannis, Vasilis Katos, David Langley, Sotiris Nikolettseas
 - **REFRESH (4th International Workshop on Real-life modeling in 5G/6G networks and beyond)**
Chairs: Eirini Eleni Tsiropoulou, Symeon Papavassiliou
 - **LS-NoT (1st International Workshop on Long and Short Range Wireless Technologies Applied to IoT for Networks of Tomorrow)**
Chairs: Jana Koteich, Nina Santi, Damien Wohwe Sambo

Tuesday, June 20, 2023

- **TI (1st International Workshop on Next Generation IoT and AI systems for Trusted, Human-Centered Intelligence)**
Chairs: Pedro Maló, Luís Lino Ferreira, Filipe Moutinho, Martin Serrano, João Rosas, Pavlos Kranas
- **UrbCom (5th International Workshop on Urban Computing)**
Chairs: Leandro A. Villas, Thiago H. Silva, Daniel L. Guidoni, Geraldo P. R. Filho, Vinícius F. S. Mota
- **Wi-DroIT (5th International Workshop on Wireless Sensors and Drones in Internet of Things)**
Chairs: Federico Corò, Panagiotis Kolios

Wednesday, June 21, 2023

- **ISIoT (5th International Workshop on Intelligent Systems for the Internet of Things)**
Chairs: Vasos Vassiliou, Savvas Chatzichristofis, Michael Georgiades, Zinon Zinonos
- **DISCOLI (2nd International workshop on DIStributed COLlective Intelligence)**
Chairs: Roberto Casadei, Noel Crespi, Claudio Savaglio, Christos Tsigkanos

IoT15 (5th International Workshop on IoT Applications and Industry 5.0)

Monday, 19 June

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| 08.30-09.00 | Registration Opens |
| 09.00-09.30 | Welcome and Introduction |
| 09.30-10.30 | Main Event Keynote Talk: "SPICE: Securing the lifecycle of Smart Homes" <i>Prof. David Kotz, Dartmouth College, USA</i> |
| 10.30-11.00 | Coffee Break |
| 11.00-13.00 | <p style="text-align: center;">IoT Analytics</p> <ul style="list-style-type: none"> • Symbiotic Positioning, Navigation, and Timing <i>Md Sadman Siraj, Aisha B Rahman, Eirini Eleni Tsiropoulou, Symeon Papavassiliou and Jim Plusquellic</i> • Validation of ESDS Using Epidemic-Based Data Dissemination Algorithms <i>Loic Guegan, Issam Rais and Otto J. Anshus</i> • False Data Injection Attacks against High Voltage Transmission Systems <i>Panagiotis Radoglou-Grammatikis, Magda Zafeiropoulou, Maria Atanasova, Pencho Zlatev, Sofia Giannakidou, Thomas Lagkas, Vasileios Argyriou, Evangelos Markakis, Ioannis Moscholios and Panagiotis Sarigiannidis</i> • Impact of Training Set Size on Resource Usage of Machine Learning Models for IoT Intrusion Detection <i>Barikisu Asulba, Nuno Schumacher, Pedro Souto, Pedro M. Santos, Luis Almeida, Nuno Martins and Joana Sousa</i> • Fabric Composition Classification using Hyper-Spectral Imaging <i>Jacob Clark, Gordon Johnson, Olga Duran and Vasileios Argyriou</i> • Variational Quantum Approach for the Multiple Traveling Salesman Problem Optimisation <i>Yannis Spyridis, Athanasios Gkelias and Vasileios Argyriou</i> |
| 13.00-14.00 | Lunch |
| 14.00-15.15 | <p style="text-align: center;">Industrial IoT</p> <ul style="list-style-type: none"> • A holistic framework for production scheduling in Industry 4.0 <i>Dimitris Dimoudis, Thanasis Vafeiadis, Alexandros Nizamis, Emma Musiari, Luca Ziliotti, Dimosthenis Ioannidis and Dimitrios Tzovaras</i> • A Scheduling Method for Tasks and Services in IIoT Multi-Cloud Environments <i>Weifan Zhang, Sokol Kosta and Preben Mogensen</i> |

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| | <ul style="list-style-type: none"> • LEM: a Tool for Large-Scale Workflow Control in Edge-based Industry 5.0 Applications <i>Rui Reis, Pedro Miguel Santos, Mário Jorge Sousa, Nuno Martins, Joana Sousa and Luis Almeida</i> • Realizing predictive maintenance in production machinery through low-cost IIoT framework and anomaly detection: A case study in a real-world manufacturing environment <i>Gabriel Filios, Stylianos Karatzas, Marios Krousarlis, Sotiris Nikolettseas, Stefanos H. Panagiotou and Paul Spirakis</i> |
| 15.15-15.45 | Coffee Break |
| 15.45-16.45 | <p style="text-align: center;">IoT Applications</p> <ul style="list-style-type: none"> • Fabric Composition Classification using Hyper-Spectral Imaging <i>Jacob Clark, Gordon Johnson, Olga Duran and Vasileios Argyriou</i> • Enhancing Smart Agriculture Scenarios with Low-code, Pattern-oriented functionalities for Cloud/Edge collaboration <i>Georgios Fatouros, George Kousiouris, Theophile Lohier, Georgios Makridis, Ariana Polyviou, John Soldatos and Dimosthenis Kyriazis</i> • Evaluation of Environmental Conditions on Object Detection using Oriented Bounding Boxes for AR Applications <i>Vladislav Li, Barbara Villarini, Jean-Christophe Nebel, Thomas Lagkas, Panagiotis Sarigiannidis and Vasileios Argyriou</i> |
| 19.00-20.00 | Welcome reception (at pool area of Coral Hotel) |

SecRIoT (4th International Workshop on Security and Reliability of IoT Systems)

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| 08.30-09.00 | Registration Opens |
| 09.00-09.30 | Welcome and Introduction |
| 09.30-10.30 | Main Event Keynote Talk: "SPICE: Securing the lifecycle of Smart Homes" <i>Prof. David Kotz, Dartmouth College, USA</i> |
| 10.30-11.00 | Coffee Break |
| 11.00-12.55 | <p>Session Chair: Athanasios Kakarountas</p> <ul style="list-style-type: none"> • The Threat of Adversarial Attacks Against Machine Learning-based Anomaly Detection Approach in a Clean Water Treatment System <i>Naghmeh Moradpoor, Leandros Maglaras, Ezra Abah and Andres Robles-Durazno</i> • An efficient and lightweight commitment scheme for IoT data streams <i>Angeliki Katsika, Konstantinos Papageorgiou, Alexandros Fakis, Vassilis Plagianakos and Georgios Spathoulas</i> • Detecting Targeted Interference in NB-IoT <i>Diana Gabriela Morillo Fweltala, Utz Roedig and Dirk Pesch</i> • Review of the NIST Light-weight Cryptography Finalists <i>William J Buchanan and Leandros Maglaras</i> • Towards Cyber Threat Intelligence for the IoT <i>Alfonso Iacovazzi, İsmail Bütün, Han Wang and Shahid Raza</i> • Internet of Things challenges and the emerging technology of TinyML <i>Vasileios Tsoukas, Anargyros Gkogkidis and Athanasios Kakarountas</i> |
| 13.00-14.00 | Lunch |
| 19.00-20.00 | Welcome reception (at pool area of Coral Hotel) |

Emerging Topics in IoT – Joint Event (SmaCE/REFRESH/LS-NOT)

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|-------------|---|
| 08.30-09.00 | Registration Opens |
| 09.00-09.30 | Welcome and Introduction |
| 09.30-10.30 | Main Event Keynote Talk: “SPICE: Securing the lifecycle of Smart Homes” <i>Prof. David Kotz, Dartmouth College, USA</i> |
| 10.30-11.00 | Coffee Break |
| 11.00-13.05 | <p>Session 1: Welcome by Session Chair Marios Angelopoulos</p> <ul style="list-style-type: none"> • The Circular Economy as a requirement for smart information system designs. <i>René Herbert Reich, Luc Alaerts and Karel Van Acker</i> • AI based Predictive Maintenance as a Key Enabler for Circular Economy: The KYKLOS 4.0 Approach <i>Yacine Rebahi, Benjamin Hilliger, Patrick Lowin and Alberto Cardoso</i> • Digital Product Passports: Use Cases Framework and Technical Architecture Using DLT and Smart Contracts <i>Constantinos Marios Angelopoulos, Gokay Sisik and Szymon Nowacki</i> • Realizing Digital Product Passports with Crowdsourcing Principles: The Case of Sustainable Smart Grids <i>Konstantinos Voulgaridis, Thomas Lagkas, Dimitris Karampatis, Vasileios Argyriou and Panagiotis Sarigiannidis</i> • Leveraging Networked Sensors to Improve Irrigation in Apple Orchards: A Lab Prototype <i>Arthur Tumanyan, Greta Grigoryan and Theofanis Raptis</i> • GestureSet: Public Domain Dataset for Human Gesture Recognition using Wrist-worn Devices <i>Pantelis Tzamalís, Sotiris Nikolettseas and Paul G. Spirakis</i> |
| 13.00-14.00 | Lunch |
| 14.00-15.05 | <p>Session 2: Welcome by Session Chair Eirini Eleni Tsiropoulou</p> <ul style="list-style-type: none"> • Symbiotic Content Caching in Next-Generation Information-Centric Networking <i>Aisha B Rahman, Panagiotis Charatsaris, Ms Sadman Siraj and Eirini Eleni Tsiropoulou</i> • On the Accuracy-Energy Tradeoff for Hierarchical Federated Learning via Satisfaction Equilibrium <i>Panagiotis Charatsaris, Maria Diamanti and Symeon Papavassiliou</i> |

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| | <ul style="list-style-type: none"> • Intent-driven Distributed Applications Management over Compute and Network Resources in the Computing Continuum <i>Anastasios Zafeiropoulos, Eleni Fotopoulou, Constantinos Vassilakis, Ioannis Tzanettis, Chiara Lombardo, Alessandro Carrega and Roberto Bruschi</i> |
| 15.05-15.45 | <p style="text-align: center;">Coffee Break</p> |
| 15.45-16.20 | <p style="text-align: center;">Session 3: Welcome by Session Chair Jana Koteich</p> <ul style="list-style-type: none"> • Empirically Investigating the Impact of Antenna Polarization and Modulation Parameters on Subsoil Communication Range in LoRa Networks <i>Nhan D.T. Nguyen, Duc V. Le and Paul J.M Havinga</i> • Enabling LoRa energy awareness: A Multihop One-Hop Routing Protocol for Prolonging Network Lifetime <i>Ioannis Katsidimas, Alexandros-Ioannis Manolopoulos and Sotiris Nikolettseas</i> • Weather-aware Wake-up of Sleeping Cyber-Physical IoT Nodes <i>Steffen Randrup, John Markus Bjørndalen, Issam Rais, Phuong Hoai Ha and Otto J. Anshus</i> |
| 19.00-20.00 | <p style="text-align: center;">Welcome reception (at pool area of Coral Hotel)</p> |

TI (1st International Workshop on Next Generation IoT and AI systems for Trusted, Human-Centered Intelligence)

Tuesday, 20 June

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| 08.30-09.30 | Registration Opens |
| 09.30-10.30 | Main Event Keynote Talk “Towards the Internet of (Wild) Things” Prof. Andrew Markham, University of Oxford, UK |
| 10.30-11.00 | Coffee Break |
| | <p>Session 1: EU Project Presentations: Trusted Industrial Applications</p> <ul style="list-style-type: none"> Data Marketplaces: Best Practices, Challenges, and Advancements for Embedded Finance <i>Athanasios Kiourtis, Argyro Mavrogiorgou, Georgios Makridis, Georgios Fatouros, John Soldatos and Dimosthenis Kyriazis</i> Comprehensive Architecture for Data Quality Assessment in Industrial IoT <i>Georgios Fatouros, Georgios Makridis, Argyro Mavrogiorgou, John Soldatos, Michael Filippakis and Dimosthenis Kyriazis</i> AI-based Public Policy Making: a new holistic, integrated and “AI by design” approach <i>Alessandro Amicone, Luca Marangoni, Alessandro Marceddu and Massimo Miccoli</i> Semantic Interoperability Toolkit for Data Marketplaces <i>Márcio Mateus, Bruno Almeida, Gonçalo Rolo, Gonçalo Rodrigues, António Gonçalves, Tiago Teixeira and Pedro Maló</i> Trusted Virtual Reality Environment for Training Security Officers <i>Anastasios Pantazidis, Alexandros Gazis, John Soldatos, Marios Touloupou, Evgenia Kapassa and Sophia Karagiorgou</i> Trusted AI for Transparent Public Governance Fostering Democratic Values <i>George Manias, Dimitris Apostolopoulos, Sotiris Athanassopoulos, Spiros Borotis, Charalampos Chatzimallis, Theodoros Chatzipantelis, Marcelo Corrales Compagnucci, Tanja Zdolsek Draksler, Fabiana Fournier, Magdalena Goralczyk, Alenka Gucek, Andreas Karabetian, Stavroula Kefala, Dimitris Kotios, Matej Kovacic, Danai Kyrkou, Lior Limonad, Sofia Magopoulou, Konstantinos Mavrogiorgos, Vasiliki Moumtzi, Septimiu Nechifor, Dimitris Ntalaperas, Georgia Panagiotidou, Martha Papadopoulou, Xanthi S. Papageorgiou, Nikos Papageorgopoulos, Dusan Pavlovic, Elena Politi, Vicky Stroumpou, Apostolos Vontas and Dimosthenis Kyriazis</i> |
| 13.00-14.00 | Lunch |

Session 2: Trustworthy and Explainable AI

- **Towards a Unified Multidimensional Explainability Metric: Evaluating Trustworthiness in AI Models**
Georgios Makridis, Georgios Fatouros, Athanasios Kiourtis, Dimitrios Kotios, Vasileios Koukos, Dimosthenis Kyriazis and John Soldatos
- **A No Code XAI Framework for Policy Making**
Marta Patiño Martínez and Ainhoa Azqueta-Alzúaz.
- **Feature Selection via Minimal Covering Sets for Industrial Internet of Things Applications**
Ioannis Christou, John Soldatos, Thanasis Papadakis, Daniel Gutierrez-Rojas and Pedro Nardelli
- **Explainable Artificial Intelligence to Enhance Data Trustworthiness in Crowd-Sensing Systems**
Sam Afzal-Houshmand, Dimitrios Papamartzivanos, Sajad Homayoun, Entso Veliou, Christian Jensen, Athanasios Voulodimos and Thanassis Giannetsos
- **Evaluation of AI-Supported Input Methods in Augmented Reality Environment**
Akos Nagy, Thomas Lagkas, Panagiotis Sarigiannidis and Vasileios Argyriou

14.00-
15.45

20:00-
22:00

Conference Dinner (at Armonia Restaurant of Coral Hotel)

UrbCom (5th International Workshop on Urban Computing)

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| 08.30-09.30 | Registration Opens |
| 09.30-10.30 | Main Event Keynote Talk “Towards the Internet of (Wild) Things” Prof. Andrew Markham, University of Oxford, UK |
| 10.30-11.00 | Coffee Break |
| 11.00-13.00 | <p style="text-align: center;"><i>Session 1</i></p> <ul style="list-style-type: none"> • Zone-based Popularity-oriented Multi-layer Content Caching in Vehicular Fogs <i>K M Nafiul Hassan and Robson De Grande</i> • Quantifying the variability of energy consumption in IoT edge nodes <i>Salma Tofaily, Issam Raïs and Otto Anshus</i> • HealthAir: A Crowdsourcing mHealth Platform for Air Pollution Effects on Citizens Health Status <i>Ioannis Katsidimas, Sotiris Nikolettseas, Stefanos H. Panagiotou and Christina Spyropoulou</i> • MALTREAT – A Metaheuristic Algorithm for Allocation of Resources in ad-hoc Vehicular Networks <i>Euclides Gottsfritz, Matheus Quessada, Douglas Lieira, Daniel L. Guidoni, Geraldo Filho and Rodolfo Meneguette</i> • Assessing the Potential of Electric Mobility in Reducing Vehicular Greenhouse Gas Emissions <i>Joao M Duarte, Kenny Assuncao, Leandro A Villas and Torsten Braun</i> • A Study of Charging Station Location for Electric Vehicles in Intelligent Transportation Systems <i>Alex Vitorino, João Paulo S. de Freitas, Fernanda S. H. de Souza, Geraldo P. Rocha Filho, Rodolfo I. Meneguette and Daniel L. Guidoni</i> • Fuzzy-Based Dynamic Priority-driven Allocation for Internet of Vehicles <i>Mohaimin Ehsan, Rodolfo Meneguette and Robson De Grande</i> |
| 13.00-14.00 | Lunch |
| 20:00-22:00 | Conference Dinner (at Armonia Restaurant of Coral Hotel) |

Wi-DroIT (5th International Workshop on Wireless Sensors and Drones in Internet of Things)

Tuesday, 20 June

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| 08.30-09.30 | Registration Opens |
| 09.30-10.30 | Main Event Keynote Talk “Towards the Internet of (Wild) Things” Prof. Andrew Markham, University of Oxford, UK |
| 10.30-11.00 | Coffee Break |
| 13.00-14.00 | <i>Lunch</i> |
| 14.00-15.45 | <p>Session: 1</p> <ul style="list-style-type: none"> • Supporting geographically widespread UAV swarms through graph-based network relaying <i>David Clerigues, Jamie Wubben, Carlos Calafate, Juan-Carlos Cano and Pietro Manzoni</i> • A Fault-Tolerant Distributed Air-to-Ground Communication Architecture for Urban Air Mobility <i>Shashini Thamarasie Wanniarachchi and Volker Turau</i> • Reinforcement Learning-based Countermeasures against Attacking UAV Swarms <i>Jennifer Simonjan, Kseniia Harshina and Melanie Schranz</i> • Land & Localize: An Infrastructure-free and Scalable Nano-Drones Swarm with UWB-based Localization <i>Mahyar Pourjabar, Ahmed Alkatheeri, Manuele Rusci, Agata Barcis, Vlad Niculescu, Eliseo Ferrante, Daniele Palossi and Luca Benini</i> |
| 15.45-16.10 | Coffee Break |
| 16.10-17.25 | <p>Session: 2</p> <ul style="list-style-type: none"> • Positioning, Navigation, and Timing on the Air <i>Md Sadman Siraj, Aisha B Rahman, Panagiotis Charatsaris, Eirini Eleni Tsiropoulou and Symeon Papavassiliou</i> • Deep Reinforcement Learning for Combined Coverage and Resource Allocation in UAV-Aided RAN-Slicing <i>Lorenzo Bellone, Boris Galkin, Emiliano Traversi and Enrico Natalizio</i> • A Multi-task Learning Framework for Drone State Identification and Trajectory Prediction <i>Antreas Palamas, Nicolas Souli, Tania Panayiotou, Panayiotis Kolios and Georgios Ellinas</i> |
| 20:00-22:00 | Conference Dinner (at Armonia Restaurant of Coral Hotel) |

ISIoT (5th International Workshop on Intelligent Systems for the Internet of Things)

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| 08.30-09.00 | Registration Opens |
| 09.00-09.10 | Welcome and Introduction |
| 09.10-10.30 | <p style="text-align: center;"><i>Session 1</i></p> <ul style="list-style-type: none"> • A Lightweight Software Stack for IoT Interoperability within the Computing Continuum <i>Dimitrios Spatharakis, Ioannis Dimolitsas, Giacomo Genovese, Ioannis Tzanettis, Nikos Filinis, Eleni Fotopoulou, Constantinos Vassilakis, Anastasios Zafeiropoulos, Antonio Iera, Antonella Molinaro, Symeon Papavassiliou</i> • Advanced concrete optical fibre sensors for remote structural health monitoring of concrete structures <i>Antreas Theodosiou</i> • LoRa-based Environmental Monitoring System for Commercial Farming <i>A. Anastasiou, Z. Zinonos and M. Georgiades</i> • Technological Innovations in Agriculture for Scouting <i>Halyomorpha halys</i> in Orchards <i>Lennart Almstedt, Davide Baltieri, Francesco Betti Sorbelli, Davide Cattozzi, Daniele Giannetti, Amin Kargar, Lara Maistrello, Alfredo Navarra, David Niederprüm, Brendan O’Flynn, Lorenzo Palazzetti, Niccolò Patelli, Luca Piccinini, Cristina M. Pinotti, Lars Wolf, and Dimitrios Zorbas</i> |
| 10.30-11.00 | Coffee Break |
| 11.00-13.00 | <p style="text-align: center;"><i>Session 2</i></p> <ul style="list-style-type: none"> • Emerging technologies for V2X communication and Vehicular Edge Computing in the 6G era: Challenges and Opportunities for Sustainable IoV <i>Michael Georgiades, Marios S. Poullas</i> • Autonomous Driving through Deep Learning in Video Games: A Visual-Based Perception and Action Approach <i>Anestis Kastellos, Socratis Gkelios, Savvas A. Chatzichristofis, Pericles Leng Cheng</i> • A ROS-based Autonomous Vehicle testbed for the Internet of Vehicles <i>Nikolaos Sarantinoudis, George Tsinarakis, Lefteris Doitsidis, Savvas Chatzichristofis, George Arampatzis</i> • Blip: Identifying Boats in a Smart Marina Environment <i>Trifun Savić, Keoma Brun-Laguna, Thomas Watteyne</i> • IoT for Sustainable Hospitality: A Systematic Review of Opportunities and Challenges for the Hospitality Industry Revolution <i>Marios S. Poullas, Elena Kakoulli</i> |
| 12:40-13.40 | Lunch |
| 16.30 | Excursion (Pafos Mosaics, Tombs of the Kings, Castle, Old Town) |

DISCOLI (2nd International workshop on DIStributed COLlective Intelligence)

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| 08.30-09.00 | Registration Opens |
| 09.00-09.15 | Welcome and Introduction |
| 09.15-10.30 | <p style="text-align: center;"><i>Session 1</i></p> <ul style="list-style-type: none"> • Scaling machine learning at the edge-cloud: a distributed computing perspective <i>Fabrizio Marozzo, Alessio Orsino, Domencio Talia and Paolo Trunfio</i> • Federated Learning for Human Mobility <i>Vlad-Alexandru Proteasa, Radu-Ioan Ciobanu, Ciprian Dobre and Radu-Corneliu Marin</i> • Communication Jamming-Aware Robot Path Adaptation <i>Jonathan Diller, Neil Dantam, John Rogers and Qi Han</i> |
| 10.30-11.00 | Coffee Break |
| 11.00-12.30 | <p style="text-align: center;"><i>Session 2</i></p> <ul style="list-style-type: none"> • Animals in the Wild: Using Crowdsourcing to enhance the labelling of Camera Trap Images <i>Jens Dede and Anna Förster</i> • A BSN-enabled Collaborative Edge-Cloud Architecture for Multi-user Activity Recognition <i>Qimeng Li, Raffaele Gravina, Claudio Savaglio and Giancarlo Fortino</i> • Towards Collective Sentiment Analysis in IoT-enabled Scenarios <i>Claudio Savaglio, Roberto Casadei, Pietro Manzoni, Mirko Viroli and Giancarlo Fortino</i> |
| 12.40-13.40 | Lunch |
| 16.30 | Excursion (Pafos Mosaics, Tombs of the Kings, Castle, Old Town) |

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