

**DOCEIS**  
**2024**

**15<sup>th</sup>** Advanced Doctoral  
Conference on Computing,  
Electrical and Industrial Systems



# Technological Innovation for Human-Centric Systems

**July 3-5, 2024**

**Caparica (Lisbon) – Portugal**

**Including the associated event:**

**YEF-ECE 2024**

**8<sup>th</sup>** Young Engineers Forum on Electrical and Computer Engineering

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## Welcome Message

The 15th Advanced Doctoral Conference on Computing, Electrical, and Industrial Systems (DoCEIS 2024) aims to serve as a central hub, bringing together Ph.D. students, professors, researchers, engineers, and specialists from various countries around the topic of Technological Innovation for Human Centric Systems.

Human-Centric Systems in the electrical and computer engineering field focus on developing technologies that prioritize human needs, comfort, and usability. These systems integrate advanced sensors, intuitive user interfaces, and intelligent algorithms to create environments and devices that are intuitive and responsive to human actions. Applications may range from smart homes and wearable health monitors to collaboration between Human-AI in industrial contexts. This aligns with the principles of Industry 5.0 and Society 5.0, bridging the gap between cutting-edge technology and everyday human experiences, ensuring that advancements contribute positively to both industry and society.

DoCEIS 2024 fosters the exchange of innovative ideas, methodologies, and breakthroughs across a multidisciplinary approach combining principles from electrical engineering, human-computer interaction, and cognitive science. It is noteworthy that current trends in strategic research initiatives underscore the importance of embracing multidisciplinary and interdisciplinary methodologies in innovation. Increasingly, funding agencies are requiring researchers to integrate these approaches as mandatory into their research agendas. Additionally, DoCEIS also provide a collaborative environment encouraging early career researchers to share and discuss their research questions and collect valuable feedback among the participants of the conference. In this context, the challenge proposed by DoCEIS represents a significant step to help young researchers improve their skills, which are indispensable for aspiring doctoral candidates in their professional journey.

DoCEIS 2024, sponsored by SOCOLNET, IFIP, and IEEE IES, attracted 53 paper submissions from PhD students and their supervisors from 14 countries. Out of these submissions, 25 were selected by the International Program Committee for inclusion in the main program and covers a spectrum of application domains. As such, research results and ongoing work are presented, illustrated, and discussed in areas such as:

- Collaborative Systems
- Human-Robot Collaboration
- Human-Centric Biomedical Systems
- Cybersecurity and Safety
- Energy Management and Sustainability
- Intelligent Computational Systems
- Electronic Systems

We envisage that this compilation of papers will offer participants a captivating set of novel concepts and intellectually stimulating challenges spanning multiple disciplines. The diverse nature of the included findings is intended to spark and invigorate further research and development initiatives, encouraging a broader exploration of innovative multidisciplinary pathways.

We would like to express our sincere gratitude to all the authors for their valuable contributions to this year's conference. We also thank the PhD students involved in the organizing committee that are essential for the success of the conference. Additionally, we would like to extend our deepest appreciation to the dedicated members of the DoCEIS International Program Committee. Their assistance in the article selection process as well as their insightful comments have immensely contributed to enhancing the overall quality of the papers.

This year we are pleased to also include, as an associated event, the YEF-ECE 2024, the 8th International Young Engineers Forum on Electrical and Computer Engineering, which also attracted a good number of submissions from 8 countries.

We hope that all participants will take the opportunities offered by these events to exchange experiences and knowledge with colleagues from different universities and areas of research.

*Prof. Luis M. Camarinha-Matos*  
*Conference Chairman*

*Prof. Filipa Ferrada*  
*Program Co-Chair*

## Message from the Organizers

Greetings and welcome to DoCEIS 2024!

We are delighted to have your participation and we hope that the conference will meet your expectations as well as your sojourn in Lisbon will be pleasant. We are celebrating the 15th edition of the Advanced Doctoral Conference on Computing, Electrical and Industrial Systems and whether you are attending for the first time or have been part of all fourteen editions, we would like you to know that your attendance is an essential part of the success of this event.

The conference, held from July 3rd to the 5th, is organized in the context of the Electrical and Computer Engineering doctoral programme of the School of Science and Technology of NOVA University of Lisbon, by PhD students from the doctoral programme. The process, which entails program definition, dissemination, venue identification, and sponsorship solicitation, has proved a unique and rewarding experience that will hopefully serve as a foundation to develop the set of skills needed to contribute to the greater scientific community.

With submissions from 14 countries, it is our conviction that the 15th edition of DoCEIS, will give opportunities for sharing and exchanging original research ideas and opinions, especially for PhD students, who will have the opportunity to share and present their work in an international conference, often for the first time, gaining inspiration for future research. Additionally, this forum provides a networking platform for attendees to connect, collaborate, and communicate with fellow researchers, broadening knowledge about various fields in computing, electrical and industrial systems.

We would like to express our gratitude to our keynotes and invited speakers for taking time out of their busy schedules to share their knowledge at this event. We also want to express our sincere appreciation to all participants, for your interest, and for having submitted your papers and posters to the conference. We would also like to give a special thanks to the International Program Committee, for their critical review of the submitted papers.

We wish everyone a very pleasant and remarkable conference and we look forward to sharing with you a memorable event in DoCEIS 2024!

*The Local Organizers.*

# DoCEIS 2024 Conference Organisation

## Conference and Program Chair:

Luis M. Camarinha-Matos, Portugal

## Organizing Committee Co-chairs:

Filipa Ferrada, Portugal

Luis Gomes, Portugal

Luis Oliveira, Portugal

Nuno Amaro, Portugal

Pedro Pereira, Portugal

Rui Neves-Silva, Portugal

## International Program Committee

Antonio Abreu, Portugal

Adrian Florea, Romania

Ahaitouf Ali, Morocco

Alois Zoitl, Austria

Ana Inês Oliveira, Portugal

Angel Ortiz, Spain

Arianit Kurti, Sweden

Armando Pires, Portugal

Bachir Benhala, Morocco

Carlos Roncero-Clemente, Spain

Catarina Silva, Portugal

Enrique Romero-Cadaval, Spain

Enver Ever, Turkey

Eric Monmasson, France

Filipa Ferrada, Portugal

Filipe Moutinho, Portugal

Florin Filip, Romania

Hadj Bourdoucen, Oman

Ioan Stefan Sacala, Romania

Joao Martins, Portugal

Jose Fonseca, Portugal

Juanqiong Gou, China

Ken Pierce, UK

Lai Xu, UK

Luis Bernardo, Portugal

Luis Gomes, Portugal

Luis Oliveira, Portugal

Luis Ribeiro, Sweden

Luís Brito Palma, Portugal

Luis M. Camarinha-Matos, Portugal

Manuela Vieira, Portugal

Maria Fino, Portugal

Marin Lujak, Spain

Matthieu Luras, France

Michael Huebner, Germany

Mohammed Bait-Suwailam, Oman

Mostafa Rashdan, Kuwait

Noelia Correia, Portugal

Nour Eldeen Mahmoud Khalifa, Egypt

Nuno Paulino, Portugal

Oleksandr Veligorskyi, Ukraine

Orhan Gemikonakli, Turkey

Paul Grefen, Netherlands  
Paulo Miyagi, Brazil  
Paulo Pinto, Portugal  
Pedro Ferreira, UK  
Pedro Pereira, Portugal  
Ramon Vilanova, Spain  
Ricardo J. Rabelo, Brazil  
Rodolfo Oliveira, Portugal  
Rui Melício, Portugal  
Rui Neves-Silva, Portugal  
Saraju Mohanty, USA

Srinivas Katkoori, USA  
Thilo Sauter, Austria  
Thomas Strasser, Austria  
Tomasz Janowski, Poland  
Valentina Emilia Balas, Romania  
Vanja Ambrozic, Slovenia  
Vincent Naessens, Belgium  
Wojciech Cellary, Poland  
Xavier Boucher, France  
Zita Vale, Portugal  
Zoltán Ádám Tamus, Hungary

### **Local Organizing Committee (PhD Students)**

Alexandre Costa  
Dionísio Noque  
Elham Kermanianmiandoab  
Emanuel Mango  
Esmaeil Kondori  
Eugene Owilla Casmin  
Eurico Clemente  
Hermenegildo Paim  
Inês Almeida

João Araújo  
João Patrício  
Miguel Arvana  
Pedro Viegas  
Qamar Raza  
Rafael Barros  
Saeed Akbari  
Samaneh Rasoolianlafmejani  
Zahra Ebadpour

# Invited Keynote Speakers



**Keynote 1: Maria Gustavsson, Linköping University, Sweden**

**Title: Emerging Skill Requirements and Training Needs in the Transition to Industry 5.0**

**Short Bio:** Maria Gustavsson is a full professor in education at the Department of Behavioral Sciences and Learning (IBL), Linköping University and is a research leader at the division of Education and Sociology and the Work and Working Life research environment within IBL. In addition, she is a research leader at the HELIX Competence Centre, Linköping University. HELIX is a 5-year programme (Vinnova, 2017-2022, Due to Covid-19, extended 1 year) with a focus on sustainable development in organisations concerning how working conditions in terms of learning, health and gender equality can be combined with efficiency and innovation.

She received her PhD in education from Linköping University in 2000 and she was appointed as an associate professor in education (docent) in 2009, and an associate professor in education (biträdande professor) in 2013 and was employed as a full professor in education in 2014, Linköping University. Her research interests include Workplace learning in large industrial companies and SMEs as well as public sector organisations, Vocational/professional learning, with a focus on work-based learning in vocational/professional education, and Workplace health promotion and working conditions. She has extensive experience in leading large research projects. She has published books and several academic papers in peer-reviewed journals and presented various academic papers at conferences.

**Abstract:** What does a workplace look like where there are good opportunities for learning and development? How can you organize learning at work, and ultimately - innovative learning for the development of employees and businesses?



**Keynote 2: Fabio Fruggiero, Università degli Studi della Basilicata, Italy**

**Title: Cognitive Control in Collaborative Systems**

**Short Bio:** FABIO FRUGGIERO graduated in Mechanical Engineering at the University of Salerno with a dissertation about newly formed meta-heuristics for the industrial scheduling optimisation, 2004. He conducted his PhD in Mechanical Engineering at the University of Salerno - Italy with a dissertation about Digital Factory Application from Manufacturing to Service Environment, 2008.

Formerly, in 2008, He was post PhD student at the Mechanical Engineering Department of the University of Salerno with main topic of research: Operations Management Strategies for HealthCare optimisation.

Currently, he is Associate Professor, and responsible of the area and lab, in Industrial Systems Engineering at the School of Engineering – Mechanical Engineering Area - of the University of Basilicata- Italy. He runs courses for both Industrial System Engineering and Operations Management. Member of the PhD board in “Engineering for Innovation and Industrial Development” at the University of Basilicata.

He works as referee for different International Journals (e.g., IJSOI, IJAMT, IJPR, CPPB, EIS, TPMR, TSMSI, IJEBM, UHSE, Cogent OA etc ...) and the national minister of research. He is editor and editorial member of: Cogent Engineering Journal, Industrial and Systems Engineering, the Ergonomics Open Journal and International, Journal of Engineering Business Management. Member of the Scientific committee for BAA, MESIC, IWAR, CODIT, ISM conference. Editor of SI: “Cloud Manufacturing and Digitalization to Sustain Industrial Efficiency” for Applied Sciences; “Smart Interaction For The 4.0 Domains: Modelling and Simulating the context of Future” for IJSPM; “Industrial Sustainability: Production Systems Design and Optimization across Sustainability” for Sustainability.

Fabio has been engaged in the auto sector for both Human Factor analysis and Ergonomic research, scheduling optimization, production management, predictive maintenance. He has collaboration with firms of the



*production and service sector applying the results of his work to help multinational companies and SMEs to generate safety and Optimize services and profits.*

*He is acting as consultant to several major companies and patent initiatives. He is active in initiative for knowledge transfer to industry. His research's activity, reported in several publications in: international journals and conferences and book chapters, encompassed the area of: Human Factor and Corporate Strategy; Industrial System Design Processes; Additive Manufacturing and Advanced Manufacturing; Simulation and Virtual modelling; Agent Based Modelling; Assembly Line Balancing; HealthCare Management and Clinical Risk Assessment; Scheduling and Optimisation; Safety and Risk analysis.*

**Abstract:** The technology driven progress of Industry 4.0 has emphasized the social dimension of the production. Digital technologies, in a service-oriented approach, are adapting to worker's need in a shadowing approach. New models for individualized human-machine interaction systems are developing for facing with new challenges. This is forcing a human centric perspective that points on the sustainable resilience of smart operators, i.e., operators with «augmented» collaborative capabilities. Smart operators have to collaborate with automatic devices (fixed and moving resources) in a flexible, reliable, safe, inclusive, metacognitive way. They work on products taking through scheduled paths (typically in assembly process) or, partially, deciding sequence of tasks based on product state (generally in dis-assembly processes) and reaction to system failures/un-suitability.

Here, resources and operators are likely to adopt bi-directional learning strategies based on: stated (common) procedural rules, acquisition of signals and interpretation of intentions, inherent knowledge and construction of intelligence, achievement of results over performances. This is resulting in collaborative systems with superior cognitive capabilities. It mixes the quantitative (physical and stressor) perception with the qualitative (psychological and psychosocial) comprehension of system state.

A cognitive based control in collaborative systems can tackle unexpected situation and/or help to execute/predict complex manipulation. It can be used, especially in remanufacturing context, to unlock Human-Robot synergy and to propose proactive paths.



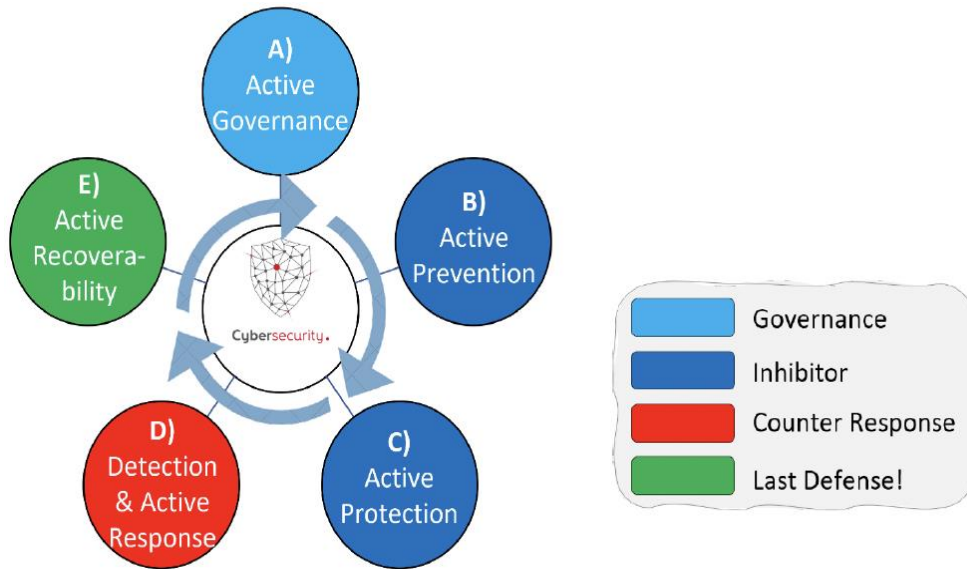
**Keynote 3: José Alegria, Former Chief Security Officer and CISO at Altice Portugal**  
**Title: Key Challenges in Cyber Security and Cyber Resilience**

**Short Bio:** José Alegria, based in Lisbon, PT, is currently a Former Chief Information Security Officer at Altice Portugal at Altice Portugal, bringing experience from previous roles at Altice Portugal and Portugal Telecom. José Alegria holds a PhD General Examination in Computer and Information Science at The Ohio State University. With a robust skill set that includes Team Management, Telecommunications, Team Leadership, ITIL, Software Project Management and more, José Alegria contributes valuable insights to the industry.

- Former Chief Security Officer and CISO at Altice Portugal. Former Worldwide Coordinator of the CyberWatch Program at the Altice Group. Former Member of European Cybercrime Center (EC3) Advisory Group on Communication Providers at EUROPOL.
- Previously, CTO at ONI Telecom, CEO of BanifServ, General Manager of IT Services at Banking Groups BBI/BFE and BFB/BPI, member of the Executive Board at IBM Portugal, Head of Data General's European EuroACE competence center.
- Senior Lecturer at New University of Lisbon, Computer Science Department. Fulbright-Hays and Gulbenkian Scholar at The Ohio State University, Columbus, OH, USA;
- Over 25 years of experience in the application of advanced software technology to cybersecurity (complex event processing, event correlation, new languages, multiparadigm frameworks, actor systems, data science and machine learning applied to cybersecurity);
- Co-advised over 66 MSc Thesis in Cybersecurity related fields.

**Abstract:**

Cybersecurity and cyber-resilience must be viewed holistically, under an active doctrine covering five dimensions: A) Governance, B) Prevention, C) Protection, D) Fast Detection and Counterresponse, and finally, F) Recovery. Prevention and Protection are designed as “inhibitor” dimensions, designed to minimise the probability of a cyber-attack materializing and succeeding.



In this talk, we will discuss this active cyber governance doctrine and identify key, challenging, new research areas.

# Program Overview

	Morning	Afternoon
<b>Day 1</b> <b>3 July</b>	<ul style="list-style-type: none"> <li>▪ <b>Opening Session</b></li> <li>▪ <b>Keynote 1: <i>Maria Gustavsson</i></b></li> <li>▪ <b>Sessions:</b> A1. Collaborative Systems</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Sessions:</b> A2. Collaborative Systems</li> <li>▪ <b>B. Intelligent Computational Systems</b></li> <li>▪ <b>Tutorial:</b> Creativity and Innovation in the Digital Era</li> <li>▪ <b>Posters</b></li> <li>▪ <b>Ice Breaking 1</b></li> <li>▪ <b>Welcome Reception</b></li> </ul>
<b>Day 2</b> <b>4 July</b>	<ul style="list-style-type: none"> <li>▪ <b>Sessions:</b> C. Human-Robot Collaboration</li> <li>▪ <b>D. Electronic Systems</b></li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Keynote 2: <i>Fabio Fruggiero</i></b></li> <li>▪ <b>Sessions:</b> E. Human-Centric Biomedical Systems</li> <li>▪ <b>Panel:</b> AI is shaping our lives ...</li> <li>▪ <b>Ice Breaking 2</b></li> <li>▪ <b>Conference Dinner</b></li> </ul>
<b>Day 3</b> <b>5 July</b>	<ul style="list-style-type: none"> <li>▪ <b>Opening YEF-ECE 2024</b></li> <li>▪ <b>Sessions:</b> F. Cybersecurity and Safety</li> <li>▪ <b>Y1.</b> Applications of remote sensing and image processing</li> <li>▪ <b>Y2.</b> Advances in Electric Vehicle Integration and Smart Grid Technologies</li> <li>▪ <b>Y3.</b> AI-powered Optimizing Infrastructure &amp; Control</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Keynote 3: <i>José Alegria</i></b></li> <li>▪ <b>Horizontal Session:</b> What do companies look for in a PhD?</li> <li>▪ <b>Sessions:</b> G. Energy Management and Sustainability</li> <li>▪ <b>Y4.</b> Emerging Technologies for Power and Electronics</li> <li>▪ <b>Closing Session &amp; Awards</b></li> </ul>

# Detailed Schedule DoCEIS 2024

Day 1 – Wednesday 3 Jul 2024

09:00 – 09:30 Opening session

09:30 – 10:30 Keynote 1

## Emerging Skill Requirements and Training Needs within Manufacturing Companies in the Transition to Industry 5.0

*Maria Gustavsson* – Professor at the Department of Behavioural Sciences and Learning, Linköping University, Sweden

10:30 – 10:45 Coffee break

10:45 – 11:45 Session A1

### A – Collaborative Systems

*Chairs:* Dionísio Noque, Alexandre Costa

- **A Human-AI Centric Performance Evaluation System for Collaborative Business Ecosystems**  
*Paula Graça, Luís M. Camarinha-Matos*
- **A Human-AI Framework to Design Collaborative Cyber Physical Systems**  
*Artem A. Nazarenko, Luis M. Camarinha-Matos*

11:45 – 13:30 Lunch

13:30 – 14:30 Session A2

### A – Collaborative Systems

*Chairs:* Dionísio Noque, Alexandre Costa

- **Analyzing Value-Sharing Methods in Energy Communities with Coalitional Game Theory**  
*Saeed Akbari, Luis M. Camarinha-Matos, Joao Martins*
- **Human-Centric Principles for Computational Systems Supporting Collaborative Creativity**  
*Zahra Ebadpour, Sanaz Nikghadam-Hojjati, Jose Barata*

## 14:30 – 16:30 Session B

### B – Intelligent Computational Systems

*Chairs:* João Patrício, Eugene Owilla Casmin

<ul style="list-style-type: none"><li>• <b>Transition Invariants in the Analysis of Concurrent Systems Modelled by Petri Nets</b> <i>Maxim Maliński, Marcin Wojnakowski, Remigiusz Wiśniewski, Andrzej Obuchowicz</i></li></ul>
<ul style="list-style-type: none"><li>• <b>Evaluating Postal Systems' Current State, Roadmap to Automation</b> <i>Uku Tulev, Eduard Shevtshenko, Ilmar Ermus</i></li></ul>
<ul style="list-style-type: none"><li>• <b>Modular and Configurable Internet of Things Devices for Value Chain Digitalization</b> <i>Miguel Arvana, João Goes, Andre Dionisio Rocha</i></li></ul>
<ul style="list-style-type: none"><li>• <b>Mapping Forest Height with Multifrequency SAR, InSAR, and Multispectral Datasets</b> <i>João E. Pereira-Pires, André Mora, Raffaella Guida, José M. Fonseca, João M. N. Silva, Pedro Barreira</i></li></ul>

## 16:30 – 16:45 Coffee break

## 16:45 – 17:45 Tutorial

### Creativity and Innovation in the Digital Era

*Fernando Angelino – IPS, Portugal*

## 17:45 – 18:30 Posters

*Chairs:* Emanuel Mango, Esmaeil Kondori

- **Context-Aware RF Sensing for Detection and Classification**  
*Eugene Casmin and Rodolfo Oliveira*
- **Channel Estimation Using Deep Learning Techniques for Extremely Large Antenna Arrays**  
*Inês de Almeida, Rui Dinis and João Guerreiro*
- **Enabling Cloud Manufacturing: An End-to-End Framework for Cyber-Physical Systems and Industrial Machine Learning**  
*Alexandre Manta-Costa, Ricardo Peres and José Barata*
- **Music plagiarism detection based on a musicological approach to music analysis**  
*Barbara Laskowska and Mariusz Kamola*
- **Federated Data Spaces in Collaborative Energy Ecosystems**  
*Hermenegildo da Silva Paim, Luís Camarinha-Matos and Filipa Ferrada*
- **Operating Water Supply Systems with Smart Predictive Digital Twins**  
*Tiago C. Pereira, António Andrade-Campos and Ramon Vilanova Arbos*

## 18:30 – 19:00 Ice Breaking Session 1

Ready to break the ice and spark some fun? Join our Ice Breaking Session for an unforgettable start of DoCEIS'24! Meet new people, share laughs, and build connections through exciting activities designed to make everyone feel welcome and energized. Don't miss out!!

## 19:00 – 20:00 Welcome reception

# Day 2 – Thursday 4 Jul 2024

## 09:00 – 10:50 Session C

### C – Human-Robot Collaboration

*Chairs:* Hermenegildo Paim, Elham Kermanianmiandoab

*Special session organizers:* Dario Antonelli (Italy), Chrysostomos D. Stylios (Greece)

- **Continual Learning Supporting Human-Robot Collaboration**  
*Yuchen Fan, Dario Antonelli, Alessandro Simeone*
- **Leveraging Information Flow-Based Fuzzy Cognitive Maps for Interpretable Fault Diagnosis in Industrial Robotics**  
*Marios Tyrovolas, Chrysostomos Stylios, Khurshid Aliev and Dario Antonelli*
- **Convolutional Neural Networks for Autonomous UAV Navigation in GPS-denied Environments**  
*Ricardo Serras Santos, João P. Matos-Carvalho, Slavisa Tomic, Marko Beko, Carlos T. Calafate*
- **Multimodal Creativity State detection from Speech and Voice**  
*Sepideh Kalateh, Luis A. Estrada-Jimenez, Sanaz Nikghadam Hojjati and José Barata*

## 10:50 – 11:05 Coffee break

## 11:05 – 12:30 Session D

### D – Electronic Systems

*Chairs:* Pedro Viegas, João Araújo

- **A Physically Unclonable Function for Biomedical Devices Authentication**  
*João Cabacinho, João Casaleiro, Luís B. Oliveira*

- **Determining Thin Film Characteristics by Prism Coupling Technique**

*Paulo Lourenço, Yuri Vygranenko, João Costa, Miguel Fernandes, Alessandro Fantoni, Manuela Vieira, G. Lavareda*

- **A Novel Analogue Computing System in HiL for Electric Traction**

*Bruno Luis, Stanimir Valtchev*

## 12:30 – 14:15 Lunch

## 14:15 – 15:15 Keynote 2

### Cognitive Control in Collaborative Systems

*Fabio Fruggiero, Università degli Studi della Basilicata, Italy*

## 15:15 – 16:45 Session E

### E – Human-Centric Biomedical Systems

*Chairs: Inês Almeida, Rafael Barros*

*Special session organizers: Luis Oliveira, Bruno Guerreiro, Filipe Silva, Hugo Gamboa (Portugal)*

- **synple: A Platform for Privacy Preserving Synthetic Patient Data Generation**

*Inês Silveira, Luís Silva, Francisco Veladas, Rodrigo Braga, Hugo Gamboa*

- **Patient-Centered Healthcare: A Framework for Analyzing Patient Feedback through Sentiment Analysis and Topic Modeling**

*Luís Osório and Nuno Fachada*

- **Nonlinear Model Predictive Control for Optimal Dose Administration in Radiotherapy**

*João C. G. Araújo, Bruno J. Guerreiro, Luis B. Oliveira, and Filipe Ferreira da Silva*

## 16:45 – 17:00 Coffee break

## 17:00 – 18:45 Panel Session

### AI is shaping our lives ...

*Moderator: Pedro Pereira*

**Carla Pereira**, Adjunct Professor at School of Health - Polytechnic University of Setúbal

**Manuel Pio Silva**, Head of Digital Energy - EDP NEW R&D

**Luís Lança**, Palo Alto Networks - Country Manager PT

**Ana Sabino**, Data Driven Decisions Product Owner - Siemens

**Nelson Freitas**, PhD Student at Department of Electrical and Computer Engineering - NOVA FCT

## 18:45 – 19:15 Ice Breaking Session 2

Did you enjoy part 1? ... Don't miss part 2!! We are waiting for you.

## 19:30 – 23:00 Conference Dinner

### Day 3 – Friday 5 Jul 2024

## 09:00 – 10:50 DoCEIS Session F, Opening YEF-ECE and YEF-ECE Session Y1

### F – Cybersecurity and Safety

Chairs: Miguel Arvana, Qamar Raza

- |   |
|---|
| <ul style="list-style-type: none"><li>• <b>Achieving Adaptive Safety via Trust Building in Autonomous Ecosystems</b><br/><i>David Halasz and Barbora Buhnova</i></li></ul>  |
| <ul style="list-style-type: none"><li>• <b>Behavioral and Human-Centric Access Control Model in XACML Reference Architecture: Design and Implementation of EHR Case Study</b><br/><i>Nastaran Farhadighalati, Jose Barata, Sanaz Nikghadam-Hojjati, and Eda Marchetti</i></li></ul> |
| <ul style="list-style-type: none"><li>• <b>Quantized Digital Amplification Physical Layer Security Schemes</b><br/><i>Pedro Viegas, Paulo Montezuma, Rui Dinis, João Guerreiro and João Oliveira</i></li></ul>  |
| <ul style="list-style-type: none"><li>• <b>Evolving Cybersecurity Challenges in the Age of AI-Powered Chatbots: A Comprehensive Review</b><br/><i>André F. Costa, Nuno Mateus Coelho</i></li></ul>  |

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## Opening YEF-ECE 2024

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## Y1 – Applications of Remote Sensing and Image Processing

Chairs: Ana Inês Oliveira, João Pedro Oliveira

- **Data Science for Geographic Information Systems**  
*Afonso Oliveira, Nuno Fachada and João P. Matos-Carvalho*
- **Forest Height Estimation Using Machine Learning Regressors with SAR Data**  
*Pedro Barreira, André Mora, João E. Pereira-Pires, José M. Fonseca and Juan Guerra-Hernández*



- **Horses Identification Through Deep Learning Algorithms**  
*Rafael Santos, Filipe Moutinho, José Prazeres, Valderi R. Q. Leithardt and João Pedro Matos-Carvalho*
- **CBP Detection Using Template Matching to Compute the Solar Rotation Profile**  
*Francisco Figueira and André Mora*
- **Super-Resolution of Multiple Sentinel-2 Images Using Composite Loss Function**  
*Shuai Liu, José M. Fonseca and André Mora*
- **Adaptive Simulation of Separate Factors in the Alexandridis Wildfire Model**  
*Isabella Papageorgiou, João Pedro Matos-Carvalho, Nuno Fachada and Markos Avlonitis*

**10:50 – 11:05 Coffee break**

**11:05 – 12:30 YEF-ECE Session Y2 & YEF-ECE Session Y3**

## **Y2 – Advances in Electric Vehicle Integration and Smart Grid Technologies**

*Chairs:* Filipa Ferrada, Luís Oliveira

- **Impact of Vehicle-to-Grid Technologies on the Electricity System**  
*Marcelo Luís, Gonçalo Glória, Ricardo Pastor and Nuno Amaro*
- **Step-by-Step Design of a LLC Resonant Converter for EV Fast Charging Applications**  
*Joao Rocha, Saghir Amin, Goncalo Rego, Joao Afonso and Vitor Monteiro*
- **Economic Feasibility of Production Units for Self-Consumption with Storage Batteries to Charge Electric Vehicles: Case Study in the Residential Portuguese Sector**  
*Rodrigo Pinheiro, Anabela Pronto and João Pina*
- **Development of a Power Electronics Interface between an Energy Storage System and the Power Grid**  
*José A. Faria, Marcos Novo, João Dias, L. A. M. Barros and J. G. Pinto*
- **A Methodology for Creating Power System Models from Open-Source Data**  
*Riccardo Chianese and Nuno Amaro*

## Y3 – AI-powered Optimizing Infrastructure & Control

*Chairs:* Anikó Costa, André Mora

- **Specification of Complex Events and Their Integration in the IOPT-Tools Development Environment**  
*Diogo Natario and Luís Gomes*
- **Extending IOPT-Nets with High-Level Features: A Digital Twin of a Power Wheelchair**  
*Carolina Lagartinho Oliveira, Filipe Moutinho and Luis Gomes*
- **AI Generated Route Data Pre - Processing for Faster Decision Making**  
*Rene Maas, Eduard Sevtsenko and Tatjana Karaulova*
- **Multi Agent Reinforcement Learning System for Vehicular and Pedestrian Traffic Control with Visible Light Communication**
- *Gonçalo Galvão, Manuela Vieira, Paula Louro, Manuel Vieira, Mário Véstias and Pedro Vieira*
- **Implementation Of an Intelligent Virtual Assistant Based on LLM Models for Irrigation Optimization**  
*Henrique Chia, Ana Inês Oliveira, Pedro Azevedo*

### 12:30 – 14:15 Lunch

### 14:15 – 15:15 Keynote 3

#### Key Challenges in Cyber Security and Cyber Resilience

*José Alegria, Former Chief Security Officer and CISO at Altice Portugal*

### 15:15 – 16:15 Horizontal Session

#### What to value in your career? An HR market-based perspective.

*Pedro Fonseca, Principal Director at NTT DATA Portugal*

*Patricia Dias, Talent Acquisition Professional at Siemens Portugal*

### 16:15 – 16:30 Coffee break

### 16:30 – 18:00 DoCEIS Session G & YEF-ECE Session Y4

#### G – Energy Management and Sustainability

*Chairs:* Saeed Akbari, Eurico Clemente

- **Rule-Based Control Algorithm to Explore Energy Flexibility from Residential Pool Filtration Pumps**

*João Tabanêz Patrício, Rui Amaral Lopes, Nuno Amaro, João Martins*

- **Three-Level Zero-Voltage Transition Interleaved Buck Converter with DC Transformer-based Isolation for EV Fast Charging Stations**

*Saghir Amin, Joao Rocha, Vitor Monteiro, Nuno Costa*

- **Promoting Decarbonization of Islands: A Case Study on the Replacement of Gas Water Heaters in Terceira Island, Azores, Portugal**

*Rafael Menezes-Barros, Rui Amaral Lopes and João Martins*

## **Y4 – Emerging Technologies for Power and Electronics**

*Chairs: Anabela Pronto, João Pedro Carvalho*

- **Shunt Active Power Filter Applied to Four-Wire Electrical Network**  
*Darcy Apresentação, Paulo Gambôa and Ricardo Luís*
- **Implementation of NMOS-based LDO Using Recycling Folded-Cascode in 16 nm FinFET**  
*Miguel Máximo, Mauro Santos, João Oliveira, Pedro Toledo, Ricardo Machado and Luis Oliveira*
- **Design of a 300mV-Supply Schmitt-Trigger-Based DIGOTA for GBW and DC Gain Enhancement in 16nm FinFET**  
*Ricardo Machado, Pedro Toledo, Luis Oliveira, Miguel Máximo, Mauro Santos and João Oliveira*
- **An Active Self-Interference Cancellation Front-end for Stepped-Frequency Continuous-Wave Radar**  
*Diogo Monteiro, João Casaleiro, Vítor Costa, Guilherme Marques and Diogo Silva*
- **Imaging with Capacitive Sensors Arrays for Powder Bed Fusion Quality Control**  
*Victor Macedo, André Oliveira, Vasco Luz and Luis Rosado*

**18:00 – 18:30 Closing Session & Awards**

## Tutorial



### **Creativity and Innovation in the Digital Era**

***Fernando Angelino*** – *IPS, Portugal*

Fernando Angelino holds a PhD in Management with specialization in Marketing at ISCTE-IUL in Lisbon, an M.Sc. in Management with specialization in Entrepreneurship and Innovation at University of Evora, and a B.Sc. in Marketing at School of Business from IPS. Has extensive professional experience in management and supervisory positions in domestic and foreign companies, with the coordination and implementation of various projects at Iberian level in the areas of information technologies, logistics, industrial property, and marketing. His current research interests include marketing, higher education, entrepreneurship, gamification, and virtual reality.

## Horizontal Session

### **What to value in your career? An HR market-based perspective.**



***Pedro Fonseca*** – *NTT Data Portugal*

Pedro is the Principal Director at NTT Data Portugal.



***Patrícia Dias*** – *Siemens Portugal*

Patrícia is a Talent Acquisition Professional at Siemens Portugal.

## Panel

### **Carla Pereira**

*Adjunct Professor at School of Health at the Polytechnic University of Setúbal*



Carla Mendes Pereira, PhD, MSc, BSc (Hons), completed her PhD in Physiotherapy / Rehabilitation at the Faculty of Health, Social Care and Education at St George's: University of London in 2017; obtained her MSc degree in Educational Sciences- specialisation in higher education awarded by the University of Coimbra, Faculty of Psychology and Educational Sciences in 2006 and graduated in Physiotherapy in 2002 by the School of Health of Alcoitão. She is an adjunct professor in the School of Health at the Polytechnic University of Setúbal, Portugal. Her current activities include: i) coordination of the master's course of Advanced Neurological Physiotherapy; ii) member of the Council of Representatives at ESS/IPS; and iii) member of the Technical-Scientific Council of ESS/IPS; and iv) member of the Ethics Commission of IPS.

### **Manuel Pio Silva**

*Head of Digital Energy - EDP NEW R&D*

Manuel Pio is currently the head of Digital Energy area at EDP NEW R&D, leading the work in European funding projects related to Renewable Energy forecasting, 5G, Energy Data Spaces and intelligent image recognition and classification. In complement, he is coordinating the consultancy works for Mozambique's Energy main utility on customers' big data and supporting the work with data for several projects related with Smart Cities and Energy grids. He holds a MSc in Electric and Electronic Engineering, a MSc in Management and a Post- Graduation in Data Science and Analytics. Prior to join EDP in 2000, he worked in Communication consultancy, was technical lecturer and collaborated in academic R&D in the field of power electronics. He is also Director of a NGO supporting pregnant women in need. Fan of swimming and hiking whatever the weather.



### **Luís Lança**

*Palo Alto Networks - Country Manager PT*

Luís Lança is the country manager of cybersecurity company Palo Alto Networks in Portugal. With an extensive experience in the area, he has held several prominent roles over the last 14 years at Logicalis Portugal, including CTO (Chief Technology Officer), Sales Director and Account

Manager. He also worked at Cilnet as an Account Manager and at Siemens Networks as a consultant and software developer.

Luís Lança studied electrical engineering at the University of Trás-os-Montes and Alto Douro (UTAD). In addition, he completed the senior management programme at AESE Business School, improving his management and leadership skills.

**Ana Sabino**

*Data-Driven Decisions Product Owner | AI Enthusiast*



Ana Sabino is a passionate Product Owner with a focus on AI-ML use cases at Siemens Smart Infrastructures. Holding a Master's Degree in Biomedical Engineering from IST and 13 years of experience with data, Ana combines her technical expertise with a deep understanding of business requirements. She bridges the gap between technology solutions and real-world impact, optimizing internal processes and product design. Looking forward to share valuable insights on AI's transformative role in the Industry.

**Nelson Freitas**

*PhD Student at Department of Electrical and Computer Engineering  
FCT NOVA*

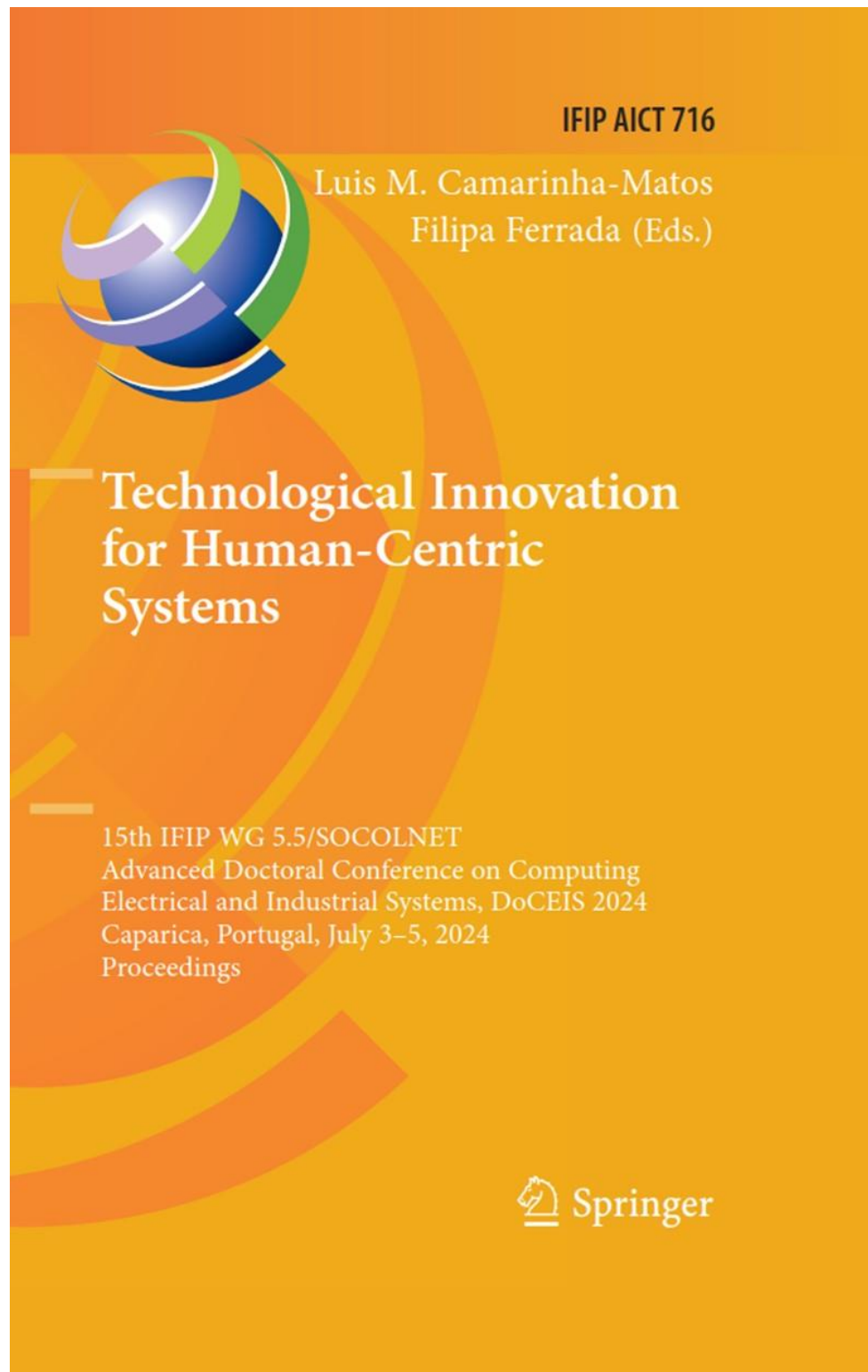


Nelson Nascimento de Freitas is a PhD student at NOVA FCT. Nelson completed his bachelor's and master's degrees at NOVA FCT and is currently enrolled in the PhD program in Electrical and Computer Engineering, specializing in robotics and manufacturing, particularly in data management within this field. Nelson is affiliated with the research center UNINOVA, where he has a fellowship and has participated in several projects, most notably the Horizon 2020 AVANGARD and the ADAM project, as well as "Smart4Health", "SmartFarm 4.0", "Smart Rotomold", "Tec4Green", and CESME. Nelson is also involved in various dissemination activities related to FCT and his academic course. He was one of the organizers and an author of DOCEIS 2023, participated in ExpoFCT and Futurália, and presented several demonstrations at events such as "Encontro de Ciência 2022", "Atlantic Innovation Week", and the 50th anniversary celebration of the New University of Lisbon.

## Proceedings

DoCEIS 2024 Proceedings are published by Springer, under its IFIP AICT series.

Proceedings in digital format are available through a link provided at the conference website.).



Similar to previous years, these proceedings will be submitted to indexing in ISI Web of Science, SCOPUS and DBLP.



# Local

The conference will be held at [TRYP Lisboa Caparica Mar Hotel in Caparica](#).



## How to Arrive at the Conference

 By Car

Directions via [Google Maps](#).

 By Boat

From Cacilhas, take bus TST no. 124 to "Costa de Caparica". Timetables available [here](#).

 By Taxi

Approximate cost is €30 during the day. Make sure the meter is running. Higher fares at night.

 By Uber

An often cheaper and convenient alternative to taxis.

## Internet Access Information

During the conference, the credentials for accessing the Internet within the Hotel TRYP Caparica are:

Network: tryplisboacaparicamar

Password: HTRYPCAPARICA





## Lunches

The lunches will be at the restaurant "[O Barbas](#)" which is about an 8 minutes walk from the conference venue (TRYP Lisboa Caparica Mar Hotel).



**For directions details, scan me!**

## Social Events

### Welcome reception



The welcome reception will take place on July 3rd at 7pm at the Sky Bar on the [TRYP Caparica rooftop](#), with a unique view over the sea, Lisbon and the mouth of the Tagus. The welcome reception is at is at the Conference Venue.

Address: Av. Gen. Humberto Delgado 47, 2829-506 Costa da Caparica

### Conference dinner

The conference dinner will be held at Quinta do Joinal on July 4th, from 7:30 PM to 11 PM. Quinta do Joinal offers an exceptional vantage point overlooking the Tagus River and Lisbon. This firm excels in event planning and premium catering, supported by a team of skilled and seasoned professionals. Transportation to Quinta do Joinal will be assured by a bus leaving from the hotel. The how to get instructions can be accessed through this [link](#).



Address: R. do Joinal 54 2825, Caparica



## Scope

Following the success of the 2017, 2018, 2019, 2020, 2021, 2022 and 2023 editions we are proud to organize the 2024 International Young Engineers Forum on Electrical and Computer Engineering – YEF-ECE 2024.

Electrical engineers apply electrical and electronic theory to obtain solutions for problems related to the development, design and operation of electrical hardware and software, control systems, electrical machines, and communications systems. Computer engineers are concerned with the design, development, and implementation of new and challenging computer technology in a myriad of consumer, industrial, commercial, and military applications. Besides development, design, operations, and research, electrical and computers engineers are typically involved in the manufacture, installation, and maintenance of computational devices, electrical and electronic equipment and systems employed by a wide variety of organizations which produce, use or provide services to such equipment, and ranging from tiny electronic devices to large complex systems.

The International Young Engineers Forum looks for the latest developments and innovative applications in electrical and computer engineering, dealing with systems' design and utilization, looking forward to efficient devices and systems with appropriate control algorithms to meet the needs of business and industry in a global economy. This event will be a unique opportunity for young engineers to connect with each other enabling experience's sharing and to become internationally active.

### General Co-Chairs:

Luis M. Camarinha-Matos (Portugal)  
Filipe Moutinho (Portugal)

### Program Co-Chairs:

João Martins (Portugal)  
Paula Louro (Portugal)  
Enrique Romero-Cadaval (Spain)  
Anikó Costa (Portugal)

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Ana Inês Oliveira (Portugal)

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### Volunteers:

Carolina Lagartinho-Oliveira (Portugal)  
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## Contacts

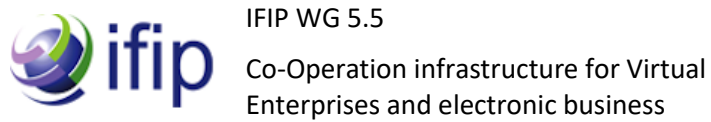
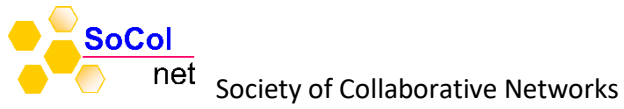
DoCEIS Secretariat

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Closed Saturday and Sunday  
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# Acknowledgements

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### Organized by:

PhD Program in Electrical and Computer Engineering,  
School of Science and Technology - NOVA University of Lisbon

# Program Overview

## DoCEIS 2024 & YEF-ECE 2024

	Wednesday – 3 Jul 2024	Thursday – 4 Jul 2024	Friday – 5 Jul 2024
09:00	<b>Opening Session</b>	09:00	<b>F</b>
09:30	<b>Keynote 1</b> Emerging Skill Requirements and Training Needs in the Transition to Industry 5.0	<b>C</b> <b>Human-Robot Collaboration</b>	<b>Opening YEF-ECE 2024</b> <b>Y1</b> Applications of Remote Sensing and Image Processing
10:30	<i>Coffee Break</i>	10:50	10:50
10:45	<b>A1</b> <b>Collaborative Systems</b>	11:05	11:05
11:45	<i>Lunch</i>	<b>D</b> <b>Electronic Systems</b>	11:05
13:30	<b>A2</b> <b>Collaborative Systems</b>	12:30	12:30
14:30	<b>B</b> <b>Intelligent Computational Systems</b>	<i>Lunch</i>	<i>Lunch</i>
16:30	<i>Coffee Break</i>	14:15	14:15
16:45	<b>Tutorial</b> Creativity and Innovation in the Digital Era	<b>Keynote 2</b> Cognitive Control in Collaborative Systems	<b>Keynote 3</b> Key Challenges in Cyber Security & Cyber Resilience
17:45	<b>Posters</b>	15:15	15:15
18:30	<b>Ice breaking 1</b>	<b>E</b> <b>Human-Centric Biomedical Systems</b>	<b>Horizontal Session</b> What to value in your career?
19:00	<b>Welcome Reception</b>	16:45	16:15
		<i>Coffee Break</i>	<i>Coffee Break</i>
		17:00	16:30
		<b>Panel</b> AI is shaping our lives ...	<b>G</b> <b>Energy Management and Sustainability</b>
		18:45	<b>Y4</b> Emerging Technologies for Power and Electronics
		19:15	18:00
		<b>Ice breaking 2</b>	<b>Closing Session &amp; Awards</b>
		19:30	18:30
		<b>Conference dinner</b>	