



# 17th APCA International Conference on Automatic Control and Soft Computing (CONTROLO 2026)

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<https://controlo2026.apca.pt/>

## Special Session on Human-Centric Cyber-Physical Systems: Intelligent Control, Robotics, and AI for Industry and Society

### Organised by

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### Call for Papers

#### Description:

The increasing convergence of intelligent control, robotics, and artificial intelligence is transforming Cyber-Physical Systems (CPS) into adaptive, human-centric ecosystems aligned with Industry 5.0 principles. This Special Session aims to explore the integration of control systems, automation, and soft computing techniques in applications that combine physical processes, digital intelligence, and human interaction.

The session emphasizes interdisciplinary approaches that bridge system theory, machine intelligence, and human-machine collaboration, addressing emerging challenges in smart manufacturing, healthcare, assistive robotics, and immersive training environments. It highlights the role of advanced control strategies, cybernetic principles, and AI-driven adaptation in enabling resilient, scalable, and context-aware systems.




Particular attention is given to human-in-the-loop systems, digital twins, and intelligent decision-making frameworks that enhance performance, safety, and user experience. By bringing together contributions from academia and industry, this session seeks to advance the state of the art in intelligent CPS and foster innovative solutions that integrate control, computation, and human factors across diverse domains.




#### Topics of interest include (but are not limited to):

- Human-centric Cyber-Physical Systems and Industry 5.0
- Intelligent Control and Autonomous Systems
- AI and Soft Computing in Control, Automation, and Robotics
- Human-Machine Interaction and Human-in-the-Loop Control

- Digital Twins and Virtual/Augmented Reality for Control Systems
- Serious Games and Immersive Platforms for Training and Certification
- Assistive Robotics and Biomedical Control Systems
- Multi-agent Systems, Swarm Intelligence, and Bio-inspired Computing
- Perception, Vision, and Navigation in Autonomous Robots (UAV, UGV, USV)
- Smart Manufacturing, Industrial IoT, and Adaptive Production Systems
- Cybersecurity, Safety, and Dependability in CPS
- Data-driven Control, Machine Learning, and Predictive Analytics
- Smart Agriculture and Environmental Monitoring Systems

## Short CV of Each Organizer

<p>Fernando Cassola Marques has a PhD in Computer Science with a thesis in the area of serious games and virtual platforms, based on the creation of a framework for behavioural change using gamification techniques. He has worked on several research projects, including: OnlineGym (3D Virtual Gym); eCompared; StopDepression; NanoStima, GresBas (EU/FCT), FEEdBACK (H2020), VRTraining, MELOA (H2020), ILIAD (H2020), BLUE-X (H2020), PRR. His main research focus is studying the relationship between behaviour and immersive environments for training and professional certification, using XR(AR/VR/MR) platforms as well as virtual worlds, metaverses and digital-twins. He is an assistant professor at FEUP in subjects related to software programming and multimedia.</p>	
<p>Rui Pinto received the M.Sc. degree in Electrical and Computer Engineering and the Ph.D. degree in Computer Engineering from FEUP, Portugal. He is a Teaching Assistant at FEUP's Department of Informatics Engineering and an Integrated Member of SYSTEC, working within the DIGI2 Lab. His research interests include Industry 4.0/5.0, CPPS, Smart Manufacturing, Artificial Immune Systems, and Engineering Education.</p>	
<p>João Ruivo Paulo has concluded his PhD in Electrical and Computer Engineering at the University of Coimbra (UC) in June 2018, with the subject "A Multimodal HMI Approach for Interaction, User Modeling and Automatic Gait Analysis on a Robotic Walker". For his PhD works, he was awarded a doctoral grant from FCT considering his curricular merit and research proposal (~60k euros). Since that date, João Paulo has continued and expanded his research. He became a post-doc researcher in two R&amp;D projects, increasing his experience which led to Principal Investigator and Co-Principal Investigator roles for FCT-funded projects and one PT2020 project.</p>	
<p>Jose Antonio Barata de Oliveira. He completed his PhD in Electrical Engineering in 2004 at the Nova University of Lisbon Faculty of Sciences and Technology, a Master's degree in Computer Engineering in 1995 at the Nova University of Lisbon Faculty of Sciences and Technology, a Bachelor's degree in Computer Engineering in 1990 at the Nova University of Lisbon Faculty of Sciences and Technology, a Bachelor's degree in Electrical Engineering in 1987 at the Polytechnic Institute of Lisbon Higher Institute of Engineering of Lisbon, and a Bachelor's degree in Radio Technology in 1982 at the Infante D Henrique Nautical School. He works in the area(s) of Engineering Sciences and Technologies with an emphasis on Electrical, Electronic and Computer Engineering with an emphasis on Robotics. In his <i>Ciência Vitae</i> curriculum, the most frequent terms in the contextualization of scientific, technological and artistic-cultural production are: Smart Manufacturing; Industry 4.0; Cyber-Physical Systems; IoT; Service Robots; Autonomous Robots; UAVs; USVs; UGVs; Perception; Vision; Navigation; SMART Agriculture.</p>	

<p>Dr. Luis Ferreira is an Associate Professor and researcher in Operations and Supply Chain Management. His recent research addresses topics on supply chain management and Lean Management. He is a core team member of the international project CHEERS4EU and leads two work packages within the national projects. Over the past five years, he has supervised 42 master's students and currently supervises five PhD candidates.</p>	
<p>Prof. Cristóvão Silva who is a Full Professor in the Department of Mechanical Engineering at the University of Coimbra. His research focuses primarily on Production Planning and Control, with particular emphasis on Low-Volume/High-Mix manufacturing environments and the impact on human worker service rates. He has published in leading international journals, including Production and Operations Management, the International Journal of Production Economics, and the International Journal of Production Research.</p>	
<p>Prof. Matthias Thüerer is a Full Professor of Operations and Supply Chain Management with strong links to industry at Chemnitz University of Technology. His expertise covers production planning and control, sustainable manufacturing, and Industry 4.0. He has published extensively in leading journals, with a focus on demand-driven production systems, workload control, and digital manufacturing. Prof. Thüerer combines rigorous academic insight with practical experience, supporting companies in optimizing production systems, improving responsiveness, and implementing data-driven decision-making. He has collaborated with industrial partners across Europe and Asia, contributing to process innovation and operational excellence.</p>	

### Additional information

This Special Session is proposed under the umbrella of the IEEE Systems, Man, and Cybernetics Society Portuguese Chapter, strengthening its alignment with systems science, cybernetics, and human-machine systems. The organizing team brings complementary expertise across cyber-physical systems, smart manufacturing, immersive environments, robotics, and biomedical engineering, ensuring a well-balanced and interdisciplinary session.

The session is expected to attract contributions from both academia and industry, including ongoing research projects, applied case studies, and experimental validations in real-world environments. The organizers will actively promote the session through their research networks, previous collaborations, and involvement in international conferences and scientific communities, ensuring a critical mass of high-quality submissions.

Particular emphasis will be placed on technically sound contributions with clear validation (experimental, simulation, or real-world deployment), aligned with the core scope of CONTROLO. The session also aims to foster collaboration between different domains, such as control, AI, robotics, and human factors, encouraging cross-disciplinary dialogue and future joint initiatives.

The organizers are committed to supporting the review process and ensuring the scientific quality and coherence of the session.