

## Special session proposal for IJCIEOM 2025 conference SPS3

**1. Session title:** Industry 5.0-based Design of Industrial Systems: Rethinking Methodologies, Procedures, and Guidelines for a Paradigm Shift

**2. Session objectives:**

Industry 5.0 profoundly restructures workers’ tasks, shifting the labour from manual to cognitive (Longo et al., 2020). A skilled worker in a smart factory of the fifth generation, an “Operator 5.0”, is expected to deliver high-value production tasks, detect misplaced procedures, and know the standardisation and legal policies needed to handle any technological tool and managerial methodology (Romero & Stahre, 2021; Maddikunta et al., 2022). Industrial environments must be rethought to support this resilient, sustainable, and human-centric paradigm shift. Design is the key enabler in this transition, allowing us to prioritize the physical and mental well-being of the operators as its primary driver. Current design methodologies and techniques for industrial systems need to be rethought, or new ones need to be developed. Accordingly, this special session will explore techniques, methodologies, frameworks, requirements, and guidelines for designing industrial systems from an Industry 5.0 perspective. Since introducing the Industry 5.0 paradigm requires systemic changes, all components of an industrial system, such as automation systems, information systems, and representation systems, are of interest.

**Topics may include, but are not limited to:**

- Methodologies and models for designing automation.
- Methodologies and models for designing information systems.
- Human cognitive well-being evaluation in industrial contexts.
- Human-centric analysis of design methodologies, procedures, and guidelines.
- Evaluation of design choices that impact human well-being.
- Inclusion of human-machine interaction in design procedures.
- Methodologies and models for designing human-machine interfaces.
- Models and methodologies for monitoring the impact of design choices on human well-being.
- Evaluation of factors influencing human well-being in industrial contexts.

**References**

- Longo, F., Padovano, A., Umbrello, S., 2020. Value-Oriented and Ethical Technology Engineering in Industry 5.0: A Human-Centric Perspective for the Design of the Factory of the Future. Applied Sciences 10, 4182. <https://doi.org/10.3390/app10124182>
- Romero, D., Stahre, J., 2021. Towards The Resilient Operator 5.0: The Future of Work in Smart Resilient Manufacturing Systems. 54th CIRP Conference on Manufacturing Systems, Procedia CIRP 104, 1089-1094. <http://doi.org/10.1016/j.procir.2021.11.183>



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*“Redesigning industrial systems towards a Sustainable, Resilient, and Human-Centric future in the digital era”*

- Maddikunta, P.K.R., Pham, Q.-V., B, P., Deepa, N., Dev, K., Gadekallu, T.R., Ruby, R., Liyanage, M., 2022. Industry 5.0: A Survey on Enabling Technologies and Potential Applications. J Ind Inf Integr 26, 100257. <https://doi.org/10.1016/j.jii.2021.100257>

### **3. Organizer(s):**

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