



# PRO-VE 2025

26th IFIP/SOCOLNET Working Conference on Virtual Enterprises

## Hybrid Human-AI Collaborative Networks

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### PRO-VE 2025 Special Session

#### AI-Driven Technologies for Sustainable Material Value Chains

##### Scope

This special session focuses on the role of Artificial Intelligence (AI) and Collaborative Networks in the digitalization of the material value chain, spanning design, processing, and manufacturing. The integration of hybrid intelligence systems, where AI-driven technologies and human expertise interact seamlessly, is essential for improving efficiency, sustainability, and decision-making in material science and engineering.

Key topics include AI-powered digital twins for adaptive simulation, modeling, and optimization, as well as semantic technologies that enhance data storage, traceability, and lifecycle assessment of materials. The session will highlight how collaborative digital platforms enable real-time data sharing, interoperability, and predictive analytics to improve material performance and reduce costs.

Emphasis will be placed on the challenges and solutions in human-AI collaboration, including trust, transparency, and cognitive interoperability within hybrid digital ecosystems. By leveraging intelligent collaborative systems, this session aims to explore innovative approaches for enhancing material quality, operational efficiency, and sustainability, driving the evolution of next-generation smart manufacturing.

This special session also aims to showcase real-world applications emerging from various research initiatives. Discussions will cover challenges in integrating AI-driven interoperability, digital twins, and semantic technologies to optimize material design and manufacturing. Specific focus will be given to data standardization, AI-assisted defect detection, real-time resource optimization, and trust management in hybrid collaborative networks. Case studies will highlight how AI and digital platforms are improving material traceability, reducing waste, and enhancing adaptability in industrial environments.

##### Session Organizers

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- Harrison de la Rosa Ramírez, *Instituto Universitario de Tecnología de Materiales (IUTM), Universitat Politècnica de València (UPV), Spain*, [hardela@epsa.upv.es](mailto:hardela@epsa.upv.es)
- Joan Lario Femenia, *Centre on Production and Engineering and Management of the Polytechnic University of Valencia, Spain*, [joalafe@upv.es](mailto:joalafe@upv.es)

##### Topics

- AI-Driven Collaborative Networks for Material Value Chain Optimization
- Digital Twins for Predictive Material Design and Manufacturing Simulation
- Semantic Technologies for Material Data Management and Sustainability
- Interoperability Between Human Expertise and AI in Smart Manufacturing

**Keywords:** Digital Twins; Hybrid Collaborative Systems; Interoperability; Data Management; Sustainable; Value Chains.

##### Submission procedure

Special sessions are included in the main Conference and follow the same reviewing process.

- 1 Mar 2025 - Special session proposal
- 11 Apr 2025 - Abstract submission (optional)
- 9 May 2025 - Full paper submission
- 20 Jun 2025 - Results notification
- 4 Jul 2025 - Camera-ready version
- 27-29 October, 2025 - Conference

Acceptance of papers is based on the **full paper** (up to **16** pages). Each paper will be evaluated by three members of the International Program Committee.

When submitting on the web site, you have to indicate the name of the special session.

Submission procedure via Easychair available on: <http://www.pro-ve.org>, with copy by email to the chairs of the special session.