



MATEMATICA
E INFORMATICA



Advancing Technology
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33rd IEEE INTERNATIONAL CONFERENCE ON ENABLING TECHNOLOGIES

WETICE 2025

*INFRASTRUCTURE FOR COLLABORATIVE
ENTERPRISES*

July 23rd-25th
Catania, Italy

Sala del 'Coro di Notte'
Ex Monastero dei Benedettini
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Proceedings of
WETICE 2025

**2025 IEEE 33rd International Conference on
Enabling Technologies: Infrastructure
for Collaborative Enterprises**

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23-25 July 2025 University of Catania, at Benedictine Monastery of “San Nicolò”
Piazza Dante, 32 - Catania, Sicily, Italy

Message from the General Chair

On behalf of the organizing and program committees, it is my great pleasure to introduce the proceedings of WETICE 2025, the 33rd IEEE International Conference on Enabling Technologies: Infrastructure for Collaborative Enterprises, this year held July 23rd-25th, 2025 in the historic site of the Benedictine Monastery of San Nicolò in Catania, a UNESCO world heritage site hosting academic departments of the University of Catania, Italy. For the first time thus WETICE is hosted in the beautiful city of Catania, Sicily (Italy), gracefully laying between the coast of the mediterranean sea and the european largest active volcano, mount Etna. Also this year the conference has been a technical event of the IEEE worldwide organization (IEEE.org) technically sponsored by the University of Catania and italian chapters of IEEE Computer Society and IEEE Systems Man and Cybernetics Society. We are grateful to our technical sponsors for their generous professional assistance, which has made a significant contribution to the success of this event, specifically to prof. Fabrizio Lamberti (IEEE CS Italy) and prof. Laura Giarre (IEEE SMC Italy).

WETICE 2025 continues the tradition of bringing together researchers, practitioners, and industry leaders to explore the latest advancements in collaborative technologies and their applications across various domains. The conference theme, “Intelligent Infrastructure for Collaborative Enterprises”, reflects the growing importance of smart, interconnected systems that enhance collaboration and innovation in today’s digital landscape. This year’s conference brought together, in-presence, researchers from several countries, including participations from both academic and industrial contexts, contributing a rich networking and exchange of diverse ideas, resulting in a collection of eighteen research papers carefully selected for oral presentation by the technical program committee, which have been featured in six technical oral sessions spanning three days of meeting in the historical site of the Benedictine Monastery. The technical program committee, co-chaired by prof. Stefano Tedeschi and prof. Emiliano Tramontana, with the invaluable contribution of prof. Giacomo Cabri, Chair of WETICE Steering Committee and Publicity Chair for WETICE 2025, has worked diligently to ensure a high-quality selection of papers that reflect the latest research and innovations in collaborative technologies. A very special thank goes to prof. Stefano Tedeschi who has played a major role in the organization of WETICE25 since the beginning of this adventure. Without his high professional skills and constant dedication and support, indeed the success of our event would have not been possible. We also express our gratitude to the Web Chair prof. Federico Santoro, to the Financial Chair dr. Salvo Monforte and to all the program committee members and external reviewers for their dedication and expertise in evaluating all the received submissions with at least three independent, conflict of interest free and anonymous reviews each.

This year we were also honoured to host two excellent keynote speakers: prof. Angelo Gargantini and prof. Giancarlo Ruffo who both receive our gratitude for giving excellent contributions to the success of the conference, presenting two extremely interesting and stimulating talks on relevant research topics, that have been respectively on the relevance of formal methods in today’s software lifecycle, and on the role of network science in understanding complex phenomena, from fake-news dynamics to urban systems resilience. The accepted technical papers covered a wide range of topics, spanning AI, distributed systems, IoT, blockchain, and AI tools for collaboration, including: Collaborative software architectures and intelligent manufacturing platforms, showcasing new approaches for cloud-native and edge-based distributed systems; Breakthroughs in AI-driven collaboration, encompassing generative models, explainable AI, reinforcement learning applications, and case studies spanning healthcare, robotics, and autonomous systems; Applications of blockchain and decentralized ledgers for supply chain management, digital asset governance, and secure peer-to-peer communication. WETICE continues its long-standing tradition of fostering dialogue across academia, industry, and government, aiming to shape the future of collaborative technology. We are deeply grateful to all authors, reviewers, sponsors, and participants for their contributions, and we look forward to the impact this work will have in advancing intelligent infrastructure for the collaborative enterprises of tomorrow. See you next year for WETICE 2026!

prof. ing. Andrea Calvagna, PhD
General Chair, WETICE 2025
Dipartimento di Matematica e Informatica
Università degli studi di Catania, Italy

2025 IEEE 33rd International Conference on Enabling Technologies: Infrastructure for Collaborative Enterprises

WETICE 2025

Conference Program

Invited Talk: Prof. Angelo Gargantini (University of Bergamo, Italy)

Are (formal) models still really useful in software engineering?

Abstract: Models, which are an abstract mathematical representation of a system, are generally used in software engineering for several reasons, including, to formally specify system requirements and share them among stakeholders (e.g., developers, clients, designers). Their main classical goal is to document the system for future reference, and to analyze the system to be built in order to find issues as soon as possible. Modeling is often associated to a classical waterfall software process model as one of the first phases of the process. In some approaches, like Model-Driven Engineering, models are paramount, while in agile processes, models play a margin (if not null) role. In this talk, we will try to give a conceptual framework able to guide developers to evaluate how much modeling is necessary in their project. We will consider problems like model updating and the cost of correcting bugs without models. Furthermore, we will introduce the idea of reverse modeling, when models are extracted from existing code and co-modeling when models and code co-evolve together linked in a formal way.

Invited Talk: Prof. Giancarlo Ruffo (University of Piemonte Orientale “A. Avogadro”)

Connected worlds: how networks can help to understand fake news spreading, urban systems, and more.

Abstract: Network science has emerged as a powerful and versatile framework for understanding the complexity of real-world systems, from the viral spread of information to urban dynamics. In this talk, we will explore how the same network principles can provide valuable insights on two seemingly unrelated domains: the persistence of urban segregation patterns and the rapid dissemination of fake news online. Also, network science can help to understand if fact-checking and urban planning are effective countermeasures of the drawbacks of a hyper-connected world. Drawing on recent research, we will examine how networks capture the underlying structure of social and spatial interactions, enabling predictive modeling, scenario testing, and deeper insights into systemic behavior. This talk aims to illustrate how network models transcend disciplinary boundaries and offer a unified language for analyzing diverse complex systems.

Technical Session 1

Sustainable Mobility Through Intelligent Traffic Signals: A Reinforcement Learning Approach to Emission Reduction and Vehicle Prioritization

Hussaini Aliyu Idris (University of Modena and Reggio Emilia), Giacomo Cabri (University of Modena and Reggio Emilia)

Autonomic Cyber-Physical System for Teaching and Learning Process Engineering

Nicolas Evain (Université de Pau et des Pays de l'Adour), Ernesto Exposito (Université de Pau et des Pays de l'Adour), Mamadou Lamine Gueye (Université de Pau et des Pays de l'Adour), Philippe Arnould (Université de Pau et des Pays de l'Adour)

Latency-Constrained Overlay Networks for QoS Assurance in the Edge-Cloud Continuum

Antonella Di Stefano (University of Catania), Alessandro Genovese (University of Catania), Massimo Gollo (University of Catania), Giovanni Morana (University of Catania)

Technical Session 2

Dynamic Machine Learning Models Management for Operator Digital Twins in Industry 5.0

Lorenzo Lamazzi (University of Modena and Reggio Emilia), Francesco Franco (University of Urbino), Luca Bedogni (University of Modena and Reggio Emilia), Marco Picone (University of Modena and Reggio Emilia)

Real-Time Systems & Digital Twins: Exploring Integration Challenges and Requirements

Riccardo Morandi (University of Modena and Reggio Emilia), Marco Picone (University of Modena and Reggio Emilia), Nicola Bicocchi (University of Modena and Reggio Emilia)

Managing Paradoxical Tensions in the Implementation of Explainable AI for Product Innovation

Fabrizio Amarilli (Dublin City University), Sara Uboldi (Intellico.ai Srl), Francesca Saraceni (Intellico.ai Srl), Lorenzo Tencati (Intellico.ai Srl)

Technical Session 3

Real-Time Fraud Detection Using Machine Learning

Gaetano Alessi (Politecnico di Milano), Mariagrazia Fugini (Politecnico di Milano)

A Comparative Study of Machine Learning Algorithms for Water Quality Prediction Using SHAP-based Explainability

Giacomo Cabri (Università degli studi di Modena e Reggio Emilia), Alireza Rahimi (Università degli studi di Modena e Reggio Emilia)

Quantifying Privacy Risk in Online Agreements with COAT: An LLM Approach

Massimo Gollo (University of Catania), Alessandro Sangiorgi (Sangiorgi SRL), Giovanni Morana (University of Catania), Mirko Dimartino (Sangiorgi SRL), Flavio Esposito (Saint Louis University)

Technical Session 4

Topic Modeling for Graph-Based Analysis of Fake News Diffusion

Pasquale Avella (Università degli Studi del Sannio), Carmela Bernardo (Università degli Studi del Sannio), Marta Catillo (Università degli Studi del Sannio), Antonio Pecchia (Università degli Studi del Sannio), Francesco Vasca (Università degli Studi del Sannio), Umberto Villano (Università degli Studi del Sannio)

Some Recent Results on Using Artificial Intelligence in Collaborative Enterprises

Gloria Tamboroni (Università degli Studi di Parma), Stefania Monica (Università degli Studi di Modena e Reggio Emilia), Federico Bergenti (Università degli Studi di Parma)

Design and Implementation of a Software System for Digital Product Passport

Luca Morellini (University of Modena and Reggio Emilia), Angelo Ferrando (University of Modena and Reggio Emilia), Giacomo Cabri (University of Modena and Reggio Emilia), Massimo Garuti (Democenter)

Technical Session 5

Event Log Extraction Using Natural Language Processing and Text Embeddings

Daniel Sanchez Ferriz (Université de Pau et des Pays de l'Adour), Ernesto Exposito (Université de Pau et des Pays de l'Adour), Christian La Borderie (Université de Pau et des Pays de l'Adour)

YOLO-based Recognition of some Crop Categories from Real-World Aerial Images

Salvatore Calcagno (University of Catania), Erika Scaletta (University of Catania), Emiliano Tramontana (University of Catania), Gabriella Verga (University of Catania)

Smart IoT System for Boat Theft Prevention Using LoRaMesh and Edge ML

Damiano Vincenzo Coppola (University of Catania), Giacomo Giovanni Messina (University of Catania), Corrado Santoro (University of Catania), Federico Fausto Santoro (University of Catania), Angelo Spadola (University of Catania), Enrico Sorbello (University of Catania), Alessio Tudisco (University of Catania)

Technical Session 6

Decentralized e-Bidding for B2B Procurement using Blockchain and AI Autonomous Agents

Claudio Manno (University of Catania), Gabriele Manno (University of Catania), Emiliano Tramontana (University of Catania)

Decentralized Health Data Management: An IPFS-based Approach and Performance Evaluation

Francesco Franco (University of Urbino), Alessandro Bogliolo (University of Urbino), Sara Montagna (University of Urbino), Luca Bedogni (University of Modena and Reggio Emilia), Stefano Ferretti (University of Bologna)

FlexBoardChain Framework: Democratizing the Deployment of Blockchain-based Applications

José Ernesto Stelzer Monar (Universidade Estadual de Campinas), Andreis Purim (Universidade Estadual de Campinas), Anderson Rossanez (Universidade Estadual de Campinas), Julio Cesar dos Reis (Universidade Estadual de Campinas)

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WETICE 2025**

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The Microsoft CMT service was used for managing the peer-reviewing process for this conference. This service was provided for free by Microsoft and they bore all expenses, including costs for Azure cloud services as well as for software development and support.