Deliverable 6.8

Report on dissemination activities - final version

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Project details

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0.1	27.07.2026	Valentina Colla	Preparation of initial version
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1. Introduction

Throughout the whole project duration, the iSteel-Expert Consortium has always been committed to communicating and disseminating project results across the European steel sector and beyond as a way to maximize the impact of the project by raising the interest of the European steel industry.

This deliverable is the third of a set of 3 deliverables that are provided at M12, M24 and M36, respectively. Each of these 3 deliverables described the Dissemination and Communication activities implemented by the iSteel-Expert Consortium during a period of 12 months. This one, being the last one also provides plans for future Dissemination and Communication actions, which will be carried out beyond the project duration, considering that some research outcomes achieved a sufficient maturity only at the end of the project.

All the 3 deliverables also assess the status of achievement of the different dissemination and communication targets established in the Communication and Dissemination Plan (*Deliverable D6.2*) and identify possible revisions of the identified Dissemination and Communication strategy, wherever applicable.

The present document summarizes the Dissemination and Communication activities carried out by the iSteel-Expert partners in the third and last year of the project. It includes the activities carried out on the LinkedIn social media as well as the events targeted by the consortium for dissemination purposes.

In the third year the work focused on the full-scale implementation validation and fine-tuning of the complete iSteel-Expert system at the demonstration site of Siderpotenza. The results achieved at the end of the end of the project are particularly meaningful from a Dissemination and Communication perspective, as they all refer to a full-scale integrated and industrially demonstrated solution, and are therefore of relevant interest for the targeted steel-related scientific, technical and industrial community. On the other hand, some of results of the validation stage were achieved in the last months of the project, which implies that they will be object of Dissemination and Communication actions which will take place beyond the formal conclusion of the project.

Therefore, the Consortium agreed to keep on spreading project results in the second semester of 2026 and even beyond, to raise interest towards the developed system and favour future exploitation of the project results in the European steel sector. This is not limited to scientific publications in international conferences and journals: ongoing and future communication actions also involve the social media of the project and the project website.

All the developed activities followed the Communication and Dissemination Plan (*Deliverable D6.2*), which overall proved to be aligned with the aims and scope of the project, although some revisions were needed on the target values of some of the established target values of the Key Performance Indicators (KIP) that turned out to be overambitious

This rest of document is divided into 4 main sections:

- Section 2 describes the dissemination activities that were carried out, the revision of the dissemination strategy that was needed in the last year of the project and the plans for future dissemination actions beyond the project conclusion.
- Section 3 describes the communication activities that were carried out, the revision of the communication strategy that was needed in the last year of the project and the plans for future communication actions beyond the project conclusion.
- Section 4 provides some concluding remarks and ideas for future initiatives.

2. Dissemination activities

Dissemination is focused on the **public disclosure of the project results to specific target groups,** and has the following main Dissemination Objectives (DOs):

DO1. to raise awareness and interest of potential users on the project results;
DO2. to foster interaction with stakeholders and potential users (the ecosystem) to obtain key feedback and enhance exploitation opportunities;
DO3. to transfer knowledge of the developed solutions to the scientific community and exchange experiences which can support improvements and refining of the research activities;
DO4. to foster the acceptance of iSteel-Expert outcomes and tools in the EU steel industry;
DO5. to ensure a broad applicability of the project results also beyond the steel sector.

During the third year of the project the different components of the iSteel-Expert system have been progressively finalised and/or integrated into a unique solution to become an industrial-scale pilot. Therefore, more mature and interesting results appeared, which have been exploited by the Consortium to carry out dissemination activities targeting industrial, scientific and technical audiences in all the forms that were foreseen in the Communication and Dissemination Plan (*Deliverable D6.2*), namely as seminars, publications, presentations as well as in the project's final workshop.

In particular, a **second seminar** focused on interactions and connections with other EU-funded projects dealing with simulation for continuous vocational education and training was organised by SIM4FUTURE on September 18, 2025, during the *2025 International Multidisciplinary Modeling & Simulation Multiconference, I3M2025*, which took place in Fez (Morocco) on September 17-19, 2025. During the event, the work carried out in iSteel-Expert concerning plant operations simulations was presented and discussed together with the work of the projects entitled "*Long Life Power Platforms for Internet of Things*" (LoLiPoP-IoT – G.A. 101112286) and "*European Learning Experience Platform*," (EULEP – G.A. 101056320). The discussion comprised challenges and future directions and explored possibility of future joint initiatives and exploitation opportunities for the results of the three concerned projects. This seminar had a duration of 1.5 hours and was attended by about 15 persons.

Moreover, a **third seminar** focused on advanced image analysis in the industrial context was organised in the form of a Special Session entitled "*Image Processing and Virtual Reality for Enhanced Industrial Safety, Training and Operational Intelligence*" within the *14th International Conference on Image Processing, Theory, Tools and Applications (IPTA 2025*), which was held in Istanbul (Turkey) on October 13-16, 2025. **Figure 1** shows the program of this event, which was publicised through LinkedIn. The seminar was attended by about 20 persons, and the following two papers deriving from the iSteel-Expert project were presented and discussed by delegates from SSSA and UNIGE.

P1 A.G. Bruzzone, L. Cirillo L., X. Sina: "Context-Aware Simulation with Machine Vision for Industrial Safety", *14th International Conference on Image Processing, Theory, Tools and Applications, IPTA 2025*, Istanbul (Turkey) on October 13-16, 2025. https://doi.org/10.1109/IPTA66025.2025.11222037
P2 M.W. Akram, A. Siddique, M. Vannucci, V. Colla, G. Bavestrelli, A. Zamproni: "EAFvision: Real-Time Automated Safety Surveillance in Electric Arc Furnaces Using Deep Learning Models," *14th International Conference on Image Processing, Theory, Tools and Applications, IPTA 2025*, Istanbul (Turkey) on October 13-16, 2025. https://doi.org/10.1109/IPTA66025.2025.11222055

The above listed papers were also published in the conference proceedings and are indexed in the SCOPUS database. The abstracts of the above-listed papers are reported in **Subsections 2.1 and 2.2**

respectively, while the D&C report related to IPTA2025, prepared according to the template available in the Dissemination and Communication Plan, is contained in **Appendix I**.

Figure 1. Program of the second intermediate project workshop organised as Special Session at the international conference IPTA 2025.

Moreover, the following further **presentations** were provided by personnel of SSSA and TENOVA in relevant scientific and technical events:

P3 M.W. Akram, M. Vannucci, A. Siddique, V. Colla, G. Bavestrelli, A. Zampron: "AI-Powered IT Infrastructure for Enhanced Safety in EAF Operations," *7th European Steel and Applications Days ESTAD 2025*, Verona (Italy), October 6-9, 2025.

P4 G. Bavestrelli, R. Girelli, M.W. Akram, M. Vannucci, S. De Sio, V. Orlando: "Enhancing Steelmaking Operations through Advanced Computer Vision and Machine Learning within the iSteel-Expert Project," *ESTEP Annual Dissemination Event 2025*, Udine (Italy), October 28-30, 2025.

P5 V. Colla, M.W. Akram, A. Siddique, M. Vannucci, G. Bavestrelli: "Digital Transformation in Steel Manufacturing: An AI-Driven Monitoring and Safety Framework for EAF Operations," *International Workshop Carlo Longaretti on Digital Tools for the Metallurgical Industry DTMI 2025*, Bergamo (Italy), November 27-28, 2025.

P6 G. Bavestrelli, R. Girelli, M. Vannucci, S. De Sio, V. Orlando: "Improving steelmaking operations through advanced computer vision and machine learning within the iSteel-Expert Project," *International Workshop Carlo Longaretti on Digital Tools for the Metallurgical Industry DTMI 2025*, Bergamo (Italy), November 27-28, 2025.

P7 M. El Haddad, J. Possik, M. Gotelli, C. Yaacoub: "A Data-Driven Architecture for an Electric Arc Furnace: Interoperable ROM-Based Simulation for Steelmaking," *I-ESA (Interoperability for Enterprise Systems and Applications) Conference*, Funchal, Madera Island, (Portugal), April 13-16, 2026.

P8 G. Bavestrelli "A Remote Expert Virtual System for Enhanced Situation Awareness and Process Optimization in Electric Arc Furnace Operations" *AIST technology Conference and Exposition AISTech 2026*, Pittsburg (PA - USA), May 4-7, 2026.

P9 M. El Haddad, J. Possik, M. Gotelli, C. Yaacoub: "A Data-Driven Digital Twin Architecture for an Electric Arc Furnace Using LSTM-Based Reduced-Order Model and Distributed Simulation," *2026 Annual Modeling and Simulation Conference (ANNSIM'26)* Orlando (Florida, USA), May 4-7, 2026

The abstracts of the above-listed presentations are reported in **Subsections 2.3-9**, while the D&C reports related to the corresponding events, prepared according to the template available in the Dissemination and Communication Plan, are contained in **Appendix I**.

Presentations P3, P7 and P9 were also associated with **full papers** published in the proceedings of the corresponding conferences. Papers P7 and P9 will also be indexed on SCOPUS, but proceedings will be published in second semester of 2026.

Following Presentation P5 provided by V. Colla, the following **journal paper** was submitted and published in Open Access mode:

- V. Colla, M.W. Akram, A. Siddique, M. Vannucci, G. Bavestrelli, R. Girelli: "Digital transformation in steel manufacturing: an AI-driven monitoring and safety framework for EAF operations [Trasformazione digitale nella produzione dell'acciaio: un sistema di monitoraggio e sicurezza basato su Intelligenza Artificiale per le operazioni dei forni elettrici]" *Metallurgia Italiana*, Vol. 117, No. 5, pp. 15-25, 2026. https://doi.org/10.36146/2026_05_15

Concerning presentation P8, it is worth mentioning that Tenova was also exhibitor at the AISTech 2026 exposition, and this fact greatly helped in further spreading information on iSteel-Expert in the extremely wide and diversified audience of the event.

The **final workshop** of the project was also organised as a Special Session focused on "*Digital solutions for safety in the EAF area*" at the *14th European Electric Steelmaking Conference (EEC 2026)*, which was

held in Milan (Italy) on May 11-13, 2026, in conjunction with the *5th International Conference on Energy and Material Efficiency and CO_2 Reduction in the Steel Industry (EMECR 2026)*. The Consortium made this decision due to the possibility offered by this biyearly event, which is highly reputed in the European steel community, to ensure a wide and diversified audience and a lively discussion with researchers and practitioners working on the topics of the project.

A dedicated call for papers was issued, in agreement with the conference organisers, and spread through Linkedin (see **Figure 2**) and through the networks of the partners to gather contributions also from researchers not involved in the project, to encourage a strong participation from industry, research and academia and ensure a lively discussion around the project outcomes and their future exploitation.

Figure 2. Call for papers published on LinkedIn for the Final Workshop of the project.

The workshop, whose program is described in **Figure 3**, was attended by about 120 participants (see **Figure 4**) and comprised 6 presentations, 4 of which related to the results of iSteel-Expert provided, respectively, by TENOVA, SSSA, SIM4FUTURE and UNIRIO. As expected, the discussion was intense and very interesting, and good feedback on the project outcomes was received.

08:30 **mar 12 maggio** 08:30–10:30

Safety and Training
Sessione | **Sede:** Foscolo room | **Convener:** Enrico Malfa (Tenova)

08:30–08:50
Improving Safety in Steelmaking Operations through Advanced Computer Vision and Machine Learning within the iSteel-Expert Project
Relatore
Giovanni Bavestrelli (Tenova)

08:50–09:10
Development of Intelligent Monitoring Systems for Anomaly Detection in Electric Arc Furnace Steelmaking
Relatore
Prof. Valentina Colla (Scuola Superiore Sant'Anna)

09:10–09:30
Simulation Based Training for Industrial Operations: Interactive Learning for Complex Tasks
Relatore
Dr. Kirill Sinelshchikov (SIM4Future srls)

09:30–09:50
A Cognitive and AI-Based Training Framework for Electric Arc Furnace Workforce Development
Relatore
Emilio Jimenez (University of La Rioja)

09:50–10:10 **Enhancing EAF safety and efficiency**
Relatore
Agostino Calogero Gasparo (POLYTEC SPA)

10:10–10:30
Reducing Power-Off Times Through Maintenance, Training, and Standardization
Relatore
Tabea Decker (Badisch Stahl-Engineering)

10:30

Figure 3. Program on iSteel-Expert Workshop held as Special Session of EEC2026.

Figure 4. The audience of the project's final workshop

The presentations provided by the iSteel-Expert Consortium are listed below:

P10 G. Bavestrelli: “Improving Safety in Steelmaking Operations through Advanced Computer Vision and Machine Learning within the iSteel-Expert project.”

P11 M. Vannucci, S. Pede, M.W. Akram, A. Siddique, R. Girelli, G. Bavestrelli, V. Colla: "Development of an Intelligent Monitoring System for Anomaly Detection in Electric Arc Furnace Steelmaking."

P12 M. Massei, K. Sinelshchikov: “Simulation Based Training for Industrial Operations: Interactive Learning for Complex Tasks.”

P13 E. Jiménez, M.M. Pérez de la Parte: “A Cognitive and AI-Based Training Framework for Electric Arc Furnace Workforce Development.”

Presentations P11, P12 and P13 were also associated with **full papers** published in the proceedings of the conferences. The presentations were also collected in a booklet that represents the proceedings of the workshop and made publicly available on the project’s website.

The abstracts of the above-listed presentations are reported in **Subsections 2.10-13**, while the D&C reports related to corresponding event, prepared according to the template available in the Dissemination and Communication Plan, is contained in **Appendix I**.

To magnify the impact and the communication of project results at EEC 2026, a booth completely dedicated to the project was established at the exhibition accompanying the conference (see **Subsection 3.4**)

2.1 Context-Aware Simulation with Machine Vision for Industrial Safety

Authors:
Agostino Bruzzone[a,b], Luca Cirillo[b], Xhulia Sina[a]
[a] Università di Genova, Genova (Italy)
[b] Sim4Future, Genova (Italy)

This paper introduces a framework for enhancing industrial safety through context-aware simulation. The system is built around a modular pipeline that captures real-time data, uses object detection (YOLOv8) and image captioning (BLIP) to interpret scenes, and communicates insights through middleware to a simulation awareness layer. This layer can inject hazards and coordinate responses. By providing richer contextual understanding, the system enables earlier and more effective safety interventions, leading to increased operator confidence compared to traditional threshold-based triggers. The approach demonstrates how advanced perception and language technologies can be integrated into simulation environments to support safer and more efficient industrial operations, while also revealing new behaviors that emerge from this deeper level of situational awareness.

2.2 EAFvision: Real-Time Automated Safety Surveillance in Electric Arc Furnaces Using Deep Learning Models

Authors:
Muhammad Waseem Akram, Arslan Siddique, Marco Vannucci, Valentina Colla, Scuola Superiore Sant'Anna, Pisa (Italy).
Giovanni Bavestrelli, Alessandro Zamproni: Tenova S.p.A., Castellanza (Italy).

Ensuring safety and operational efficiency in Electric Arc Furnace (EAF) steel manufacturing is critical due to the extreme hazards such as intense heat, toxic emissions, and heavy machinery present in these environments. We propose EAFvision, a real-time automated pipeline for safety surveillance EAFs, leveraging advanced deep learning architectures. EAFvision enables real-time detection of critical safety-related situations, including personnel, electrode clamps, and smoke emissions, to enhance situational awareness and operational safety in industrial environments. We collected and carefully annotated a comprehensive image dataset from an active EAF facility to benchmark a variety of models, including YOLO versions 8 through 11, RT-DETR, and established two-stage detectors like Faster R-CNN and Mask R-CNN. Our results demonstrate that lightweight, single-stage detectors deliver superior accuracy and faster inference times compared to more complex models, enabling efficient real-time testing on edge devices for immediate hazard detection and automated response. This approach highlights the transformative potential of AI-powered real-time monitoring systems to enhance workplace safety and optimize steel production processes.

2.3 AI-Powered IT Infrastructure for Enhanced Safety in EAF Operations

Authors:
Muhammad Waseem Akram, Marco Vannucci, Arslan Siddique, Valentina Colla, Scuola Superiore Sant'Anna, Pisa (Italy).
Giovanni Bavestrelli, Alessandro Zamproni: Tenova S.p.A., Castellanza (Italy).

This study addresses significant health and safety risks in steel industry Electric Arc Furnace (EAF) plants, such as extreme temperatures and toxic fumes. It proposes an advanced automated system utilizing IT and AI to enhance workplace safety through improved process monitoring and risk prevention. A primary goal is to minimize human presence near the EAF and detect hazards in real-time. This is achieved via an IT infrastructure integrating various sensors, including cameras and microphones, to continuously monitor the operational environment and provide data for AI analysis. The system uses computer vision and neural networks to identify early signs of incidents like smoke, flames, or abnormal furnace conditions. It also monitors worker presence, thereby significantly reducing accident risks. A camera-based prototype has been developed and tested, successfully identifying risk conditions and tracking personnel proximity to the EAF in real-time. The system will be improved in the future by refining detection accuracy, integrating additional sensor data, and expanding automation to further mitigate occupational hazards in steel production.

2.4 Enhancing Steelmaking Operations through Advanced Computer Vision and Machine Learning within the iSteel-Expert Project

Authors:
Giovanni Bavestrelli, Renato Girelli: Tenova S.p.A., Castellanza (Italy).
Muhammad Waseem Akram, Marco Vannucci, Scuola Superiore Sant'Anna, Pisa (Italy).
Silvia De Sio, Vincenzo Orlando, Siderpotenza, Pittini Group (Italy)

The iSteel-Expert project pioneers an advanced computer vision and machine learning framework for monitoring and analysis of Electric Arc Furnace (EAF) operations within steel plants. Co-funded with the European Research Fund for Coal and Steel (RFCS) G.A. 101112102, the project's core mission is to develop a remote expert virtual system that enhances operator situational awareness, preserves expert knowledge, and fosters improved safety and process efficiency in 24/7 industrial environments.

This presentation focuses on the deployment and performance of several AI-powered vision modules designed to monitor critical aspects of the melting phase:

1. **Human presence detection** Leveraging deep-learning object detection architectures, the system identifies personnel presence in high-risk zones around the EAF. This ensures that operators are aware of human location relative to hazardous operations, reinforcing safety protocols and minimizing accident risk.
2. **Electrode smoke detection** A deep-learning model analyzes images to detect early signs of fumes or flames emissions around the electrodes and roof. Building on pretrained convolutional neural networks via transfer learning, this module extracts visual cues to flag potential occurrences of dangerous reactions.
3. **Slag door state detection** By analyzing camera feeds near the slag door, the system classifies whether the door is open or closed. This capability supports automated tracking of slag-removal timing and alerts operators to abnormal or unsafe states.
4. **Electrode movement** speed estimation Applying optical flow and frame-to-frame correlation, the system determines the position of the electrode and its up-and-down velocity. Movement monitoring provides critical insights into process control and identifies potential mechanical or control system degradation.
5. **Electrode-tip shape monitoring** Leveraging convolutional neural network-based segmentation, the system models and periodically assesses the electrode's tip geometry. Detecting anomalies or wear extends electrode life, minimizes unplanned downtime, and informs maintenance planning.

These modules form part of iSteel-Expert vision system which integrates cutting-edge AI techniques to reinforce safety, optimize process efficiency, and enhances knowledge preservation in steelmaking operations.

Initial deployment within the industrial EAF environment in Pittini Siderpotenza demonstrates reliable detection performance and alerting capability, supporting improved process transparency and operator decision-making. Moreover, the results highlight the potential for broader application of computer vision in the metallurgical domain and underscore the value of multidisciplinary collaboration in Industry 4.0 transformations.

Future work will focus on large-scale validation of KPIs, refinement of AI modules, and training system assessments.

2.5 Digital Transformation in Steel Manufacturing: An AI-Driven Monitoring and Safety Framework for EAF Operations

Authors:
Valentina Colla, Muhammad Waseem Akram, Arslan Siddique, Marco Vannucci, Scuola Superiore Sant'Anna, Pisa (Italy).
Giovanni Bavestrelli: Tenova S.p.A., Castellanza (Italy).

The iSteel-Expert project introduces a state-of-the-art, AI-driven monitoring and safety system specifically designed for Electric Arc Furnace (EAF) operations in steel plants. By integrating a network of sensors and cameras with a real-time data collection platform, the system exploits advanced deep learning models to automate the precise detection and classification of critical events and safety conditions within the furnace environment. This innovative approach significantly elevates both operational safety standards and overall process efficiency.

The core monitoring framework of iSteel-Expert addresses several key operational aspects. It actively performs:

- ***Person Detection in the furnace area***, to assess human exposure during the process phases, operator compliance with established procedures, and the timing of required activities.
- ***Slag Door Status Detection,*** to provide feedback on operator compliance regarding slag door control and cleanliness during the heat.
- **Monitoring of the electrode arm movement**, through the continuous detection of the position of the electrode's clamp, so to provide feedback on the regularity or abnormality of the electrode position profile during the heat, An abnormal electrode position profile may require correction of the melting profile or maintenance intervention.
- **For environmental and operational safety**, the detection of vapor, fumes, and flames is implemented to provide feedback on abnormal emissions or dangerous reaction during the heat.

A comprehensive dataset, consisting of about 5000 images, was collected for the training and validation of models across all tasks. The system demonstrated good performance, achieving a top-1 accuracy exceeding 90% for both furnace tilt detection and smoke detection. Object detection tasks consistently reported high precision, recall, and F1-scores, underscoring the system's robust and reliable event recognition capabilities.

In the current implementation, iSteel-Expert is a post-processing system. After confirmation of its reliability and efficiency, it will be converted into a real-time system capable of providing timely warnings, alarms, and suggestions. Looking ahead, iSteel-Expert advanced functionalities extend to supporting predictive maintenance by identifying patterns indicative of equipment wear or potential failures. It also facilitates process optimization through continuous, real-time monitoring and in-depth analysis of EAF operations. Moreover, the system is designed for seamless integration with existing advanced plant control systems, collectively contributing to safer, more efficient, and sustainable steel production practices.

2.6 Improving steelmaking operations through advanced computer vision and machine learning within the iSteel-Expert Project

Authors:
Giovanni Bavestrelli, Renato Girelli: Tenova S.p.A., Castellanza (Italy).
Marco Vannucci, Scuola Superiore Sant'Anna, Pisa (Italy).
Silvia De Sio, Vincenzo Orlando, Siderpotenza, Pittini Group (Italy)

The iSteel-Expert project pioneers an advanced computer vision and machine learning framework for monitoring and analysis of Electric Arc Furnace (EAF) operations within steel plants. Co-funded with the European Research Fund for Coal and Steel (RFCS) G.A. 101112102, the project's core mission is to develop a remote expert virtual system that enhances operator situational awareness, preserves expert knowledge, and fosters improved safety and process efficiency in 24/7 industrial environments.

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   Leveraging deep-learning object detection architectures, the system identifies personnel presence in high-risk zones around the EAF. This ensures that operators are aware of human location relative to hazardous operations, reinforcing safety protocols and minimizing accident risk.

2. Electrode smoke detection
   A deep-learning model analyzes images to detect early signs of fumes emissions around the electrodes and roof. Building on pretrained convolutional neural networks via transfer learning, this module extracts visual cues to flag potential occurrences of dangerous reactions.

3. Slag door state detection
   By analyzing camera feeds near the slag door, the system classifies whether the door is obstructed. This capability supports automated tracking of slag-removal timing and alerts operators to abnormal or unsafe states.

4. Electrode movement speed estimation
   Applying optical flow and frame-to-frame correlation, the system determines the position of the electrode and its up-and-down velocity. Movement monitoring provides critical insights into process control and identifies potential mechanical or control system degradation.

5. Electrode-tip shape monitoring
   Leveraging convolutional neural network-based segmentation, the system models and periodically assesses the electrode's tip geometry. Detecting anomalies or wear extends electrode life, minimizes unplanned downtime, and informs maintenance planning.

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Future work will focus on large-scale validation of KPIs, refinement of AI modules, and training system assessments.

2.7 A Data-Driven Architecture for an Electric Arc Furnace: Interoperable ROM-Based Simulation for Steelmaking

Authors:
Michel El Haddad, Jalal Possik, Charles Yaacoub, ICL, Junia, Université Catholique de Lille, Lille (France).
Marco Gotelli, Università di Genova, Genova (Italy)

Electric arc furnaces (EAFs) are central to scrap-based green steel pro-duction, but their complex operation complicates real-time optimization and operator training. This paper presents a data-driven digital-twin architecture for an industrial EAF that integrates plant measurements, a Long Short-Term Memory (LSTM) Reduced-Order Model (ROM) and a simulation-based Virtual Reality (VR) training environment. Historical EAF chemical and electrical data are cleaned, engineered, and structured into sliding windows to feed an LSTM surrogate that predicts furnace indicators relevant for training. The model is deployed as a lightweight inference service and coupled to an EAF simulation and VR environment through a High-Level Architecture (HLA)-based middleware, enabling interoperable ROM-based scenarios. Preliminary experiments on plant data demonstrate technically feasible end-to-end integration and acceptable pre-diction accuracy and latency, laying the foundation for higher-maturity, real-time digital twins for safer and more energy-efficient steelmaking.

2.8 A Remote Expert Virtual System for Enhanced Situation Awareness and Process Optimization in Electric Arc Furnace Operations

Authors:
Giovanni Bavestrelli: Tenova S.p.A., Castellanza (Italy).

This presentation describes the iSteel-Expert project, co-funded by the Research Fund for Coal and Steel (RFCS) G.A. 101112102, which implements a Remote Expert Virtual System to enhance Electric Arc Furnace (EAF) operations. This system addresses the need for improved situation awareness and knowledge preservation in the melting area. iSteel-Expert integrates several Industry 4.0 technologies, with a focus on artificial intelligence. It extends human operator sensing capabilities, providing 24/7 process monitoring and data analysis to suggest corrective actions. This approach aims to improve

process efficiency, equipment maintenance, and environmental footprint by integrating with existing EAF automation and using real operational data.

2.9 A Data-Driven Digital Twin Architecture for an Electric Arc Furnace Using LSTM-Based Reduced-Order Model and Distributed Simulation

Authors:
Michel El Haddad, Jalal Possik, Charles Yaacoub, ICL, Junia, Université Catholique de Lille, Lille (France).

Digital twins (DTs) are increasingly used in the process industries to couple simulation models, data-driven analytics and real-time data streams for monitoring, prediction and decision support. In this paper, we propose an HLA-based distributed simulation architecture for a data-driven digital twin of an industrial electric arc furnace (EAF), with a particular focus on simulation-based operator training. The DT combines a process-level AnyLogic model of the EAF with an LSTM-based reduced-order model that predicts short-horizon furnace indicators from multivariate time-series data. A Unity-based virtual-reality (VR) training environment exposes this digital-twin state to control-room operators in immersive training scenarios, while a future IoT federate will connect the federation to plant-side data sources. We detail the roles of the three federates, the design of the Federation Object Model (FOM), and the time-management requirements for hybrid real-time and accelerated operation. The current prototype, implemented as a two-federate setup (simulation + VR) on a single machine, serves as a foundation for a future full three-federate deployment and quantitative evaluation of latency, scalability and training effectiveness.

2.10 Improving Safety in Steelmaking Operations through Advanced Computer Vision and Machine Learning within the iSteel-Expert project

Authors:
Giovanni Bavestrelli: Tenova S.p.A., Castellanza (Italy).

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3. **Slag door state detection** By analyzing camera feeds near the slag door, the system classifies whether the door is obstructed. This capability supports automated tracking of slag-removal timing and alerts operators to abnormal or unsafe states.
4. **Electrode movement speed estimation** Applying optical flow and frame-to-frame correlation, the system determines the position of the electrode and its up-and-down velocity. Movement monitoring provides critical insights into process control and identifies potential mechanical or control system degradation.
5. **Electrode-tip shape monitoring** Leveraging convolutional neural network-based segmentation, the system models and periodically assesses the electrode's tip geometry. Detecting anomalies or wear extends electrode life, minimizes unplanned downtime, and informs maintenance planning.

These modules form part of iSteel-Expert vision system which integrates cutting-edge AI techniques to reinforce safety, optimize process efficiency, and enhances knowledge preservation in steelmaking operations.

Initial deployment within the industrial EAF environment in Pittini Siderpotenza demonstrate reliable detection performance and alerting capability, supporting improved process transparency and operator decision-making. Moreover, the results highlight the potential for broader application of computer vision in the metallurgical domain and underscore the value of multidisciplinary collaboration in Industry 4.0 transformations.

Future work will focus on large-scale validation of KPIs, refinement of AI modules, and training system assessments.

2.11 Development of an Intelligent Monitoring System for Anomaly Detection in Electric Arc Furnace Steelmaking

Authors:
Marco Vannucci, Stefano Pede, Muhammad Waseem Akram, Arslan Siddique, Valentina Colla Scuola Superiore Sant'Anna, Pisa (Italy).
Renato Girelli, Giovanni Bavestrelli: Tenova S.p.A., Castellanza (Italy).

The steel industry's transition toward intelligent manufacturing requires sophisticated monitoring systems capable of detecting operational anomalies in real-time. This study presents the development and implementation of Artificial Intelligence-based predictive models for automated anomaly detection in Electric Arc Furnace operations, conducted within the project entitled "*Remote expert virtual system enhancing human management capabilities that favors preservation, transfer, and continuous evolution of knowledge for steelmaking operations*" (Ref. iSteelExpert, Grant Agreement No. 101112102) , which is co-funded by the Research Fund for Coal and Steel of the European Union.

A comprehensive dataset was collected during normal production operations at an industrial facility. The dataset integrated heterogeneous data sources including chemical composition measurements,

operational parameters, and electrical signals. Operator-reported anomalies were systematically annotated, with some heats exhibiting abnormal events across eight distinct categories, including electrodes breakage, roof closing troubles, high-carbon melts, and strong furnace reactions. Several machine learning algorithms were evaluated including Random Forest, XGBoost, Histogram Gradient Boosting, Support Vector Machine, and AdaBoost. The experimental framework encompassed two complementary objectives: generic anomaly detection (identifying any abnormal heat) and specific anomaly classification (distinguishing between different anomaly types). Extensive hyperparameter optimization was performed to maximize detection capability while maintaining acceptable precision. For generic anomaly detection, the models demonstrated robust performance with balanced accuracy exceeding 80% and high detection rates. Specific anomaly classification proved more challenging due to severe class imbalance. Strategic undersampling approaches dramatically improved detection rates for most anomaly types, though requiring careful consideration of the precision-recall trade-off based on anomaly severity.

A proof-of-concept decision support system was developed, integrating genetic algorithms with trained predictive models to suggest corrective process adjustments when anomalies are predicted. The optimization framework balances avoiding alarms with minimizing deviation from current operating conditions while respecting physical and safety constraints. This represents a novel approach combining near real-time ML predictions with actionable operational recommendations in Electric Arc Furnace steelmaking. The findings demonstrate that AI-driven monitoring systems can effectively detect process deviations, particularly for subtle anomalies difficult for operators to consistently identify. Future development will focus on advanced techniques for imbalanced classification to further optimize detection capability across all anomaly categories, ultimately delivering a practical and reliable monitoring solution for Electric Arc Furnace operations.

2.12 Simulation Based Training for Industrial Operations: Interactive Learning for Complex Tasks

Authors:
Marina Massei, Kirill Sinelshchikov, Sim4Future, Genova (Italy)

Training Electric Arc Furnace operators requires time, controlled conditions, and supervised exposure to plant operations. Many critical events cannot or should not be observed during live training because they carry safety risks or depend on rare process conditions. Simulation based training addresses this gap by reproducing the operational environment without exposing personnel or equipment to danger.

The paper presents a simulation-based training environment designed to accelerate the preparation of operators in electric arc furnace plants. The system combines structured learning modules, multimedia training material, and a fully interactive 3D model of the EAF to reproduce the operational sequence from charging to tapping. The platform relies on a backend that records user actions and evaluates progress, but its central function is practical, simulation driven familiarization with real operating conditions.

Training begins with guided content that introduces the fundamental process steps, equipment configuration, and safety constraints of the furnace area. This establishes the technical baseline before the user moves to hands-on simulation.

Indeed, the core component is the embedded 3D interactive model. It provides a direct, operational representation of the furnace and auxiliary systems, allowing the trainee to perform critical tasks such as deslagging, control of foamy slag formation, tapping, tilting etc. Because the environment is simulated, users can also experience the direct consequences of wrong decisions without putting personnel or equipment at risk. This enables learning by doing, including deliberate exposure to rare, hazardous, or cost-sensitive scenarios that cannot be reproduced safely in the production plant. The full furnace phases sequence can be observed, manipulated, and repeated, supporting both procedural understanding and situational awareness.

The system serves steel plants where long-standing operational practice must coexist with modern methods. It reinforces traditional training by offering a realistic, repeatable, and risk-free reproduction of key tasks, while adding the advantages of data collection and performance tracking. The result is a unified tool that standardizes operator onboarding, strengthens safety culture, and improves the transfer of operational know-how across teams.

2.13 A Cognitive and AI-Based Training Framework for Electric Arc Furnace Workforce Development

Authors:
Emilio Jiménez, M.M. Pérez de la Parte, Sim4Future, Genova (Italy)

The growing digitalization of Electric Arc Furnace (EAF) steelmaking demands a workforce capable of operating increasingly complex and highly automated plants. Traditional training methods—shadowing, manuals, and classroom-based onboarding—are no longer sufficient to ensure consistent operational performance, safety, and rapid adaptation to new technologies. Within the EU iSteel-Expert project, we are developing an integrated, AI-enhanced training ecosystem aimed at accelerating the learning curve of new operators, reducing human error, and supporting continuous upskilling.

The proposed ecosystem combines three complementary components:

(1) NotebookLM-style knowledge environments, structured around validated technical documents, safety rules, and plant-specific best practices. These systems enable trainees to query complex information using natural language, facilitating rapid acquisition of process knowledge and reducing dependency on tacit or undocumented expertise.
(2) Cognitive agents based on the CLEAR architecture, designed to emulate expert operator reasoning, attention management and decision-making under stress or uncertainty. These agents serve as “virtual mentors” capable of demonstrating correct action sequences, highlighting risks, and explaining the rationale behind operational choices.
(3) A domain-specific training chatbot, deployed as an always-available conversational assistant for new employees. The system provides step-by-step support for operational procedures, contextual explanations for alarms and process deviations, and interactive quizzes to reinforce learning.

The training architecture has been designed to integrate seamlessly with existing simulators and digital twins developed elsewhere in the project, providing a cognitive layer oriented toward human learning rather than process modelling. Early evaluations indicate the potential to reduce onboarding time, decrease procedural errors in simulated scenarios, and improve retention of complex operational concepts compared with conventional methods.

In addition to supporting new operators, the proposal enables continuous development for experienced personnel through scenario-based training, “what-if” exercises guided by cognitive agents, and automated feedback based on decision sequences. The approach also enhances safety by reinforcing correct responses to abnormal or hazardous operating conditions.

This contribution presents how AI-driven tools, cognitive modelling and structured knowledge platforms can modernize workforce development in EAF steelmaking, addressing a critical need identified by industry stakeholders and aligning with the strategic objectives of EEC-EMECR 2026.

2.14 Internal seminars and dissemination events

Due to need to finalize the main technical achievements in due time to carry out the on-site validation stages, the Consortium decided to develop the internal dissemination activities in the last semester of the project. To this aim, a calendar has been elaborated at the beginning of 2026 related to the 8 internal dissemination events (5 seminars and 3 pilot/training sessions) to be developed online, for the personnel of the beneficiaries of the consortium, and focused on different aspects of the tools and technologies developed within the project.

Depending on the topic, each event was chaired and one partner, who had the full responsibility of the organisation of the event, the preparation of the material and, when applicable, the invitation of external speakers. Together with Tenova, the personnel of all the beneficiaries who was directly involved in iSteel-Expert was responsible to forward the invitation to each event to whom it might concern inside His/Her company/institution.

The second and third seminars were also open to external people, that were mainly researchers, technical experts and stakeholders, therefor it also represented the **fourth seminar** of the project. It was organised by Université Catholique del Lille (UCL) in the form of a dedicated iSteel-Expert workshop at the École du Numérique – EDN. The duration of each session was approximately 1 hour, and they were attended by 40 participants, including 15 in person and 25 remotely. The seminar presented the integration of AnyLogic simulation and a Unity-based virtual-reality environment through High-Level Architecture (HLA) for immersive Electric Arc Furnace operator training. Its purpose was to explain the platform’s architecture, interoperability, use of historical plant data and reduced-order modelling, as well as the principal design and implementation choices. The session held on May 26 also featured a live demonstration of the developed platform: the participants onsite and connected remotely had the possibility to experience the immersive Virtual Reality training environment developed around the industrial context of Siderpotenza.

An overview of the internal dissemination events is provided in **Table 2** for generic internal partners events and in **Table 3** for pilot training sessions.

Table 1. List of internal partners' events.

Title	Subject	Organiser	Date & Time	#Participants
Use of AI within iSteel-Expert for monitoring purposes	Introduction on the AI technologies adopted by SSSA in the context of the project for non-experts: basic principles and methodologies.	SSSA	March 17 3:00-4:00 pm	16
Metrics for monitoring of the EAF process	Introduction to the KPIs adopted for monitoring of the EAF process with the involvement of process engineers, shift supervisors, and furnace operators - Dual-mode event Language: ITALIAN	SIDER	June 11 10:00-12:00 am	30
EAF simulation solutions in iSteel-Expert	Conceptual simulation models developed within iSteel-Expert and their integration for decision-support, training and education purposes. The session would provide a high-level overview aimed at non-expert partners, addressing the role of simulation models, their interactions, and how they can be effectively used both for decision-making and for educational and training activities within the project context.	UNIRIO	May 29 10:00-11.30 am	12
Gender equity and digitalization: opportunities and threats	The seminar includes the following speeches: • Prof. A. Loretoni (SSSA): Invisibilization, stereotypes and gender bias in AI • Dr. F. Merenda (SSSA): AI, robot-design and feminized jobs • Dr. D. Majidi (President of Donne 4.0): Empowering women in tech	SSSA	May 19 2:30-3:30 pm	23
The iSteel-Expert project: challenges and results	An overview of the project addressing people who did not take part to the project, to summarise main achievements and forthcoming challenges.	TENOVA	June 25 3:00-4:30 pm	19

Table 2. List of pilot training sessions.

Title	Subject	Organiser	Date	#Participants
Data analysis and performance assessment within iSteel-Expert	Training session on iSteel-Expert dashboards developed for: • Basic data analysis • Defining training sets for models • Assessing models performance • Presenting KPIs that measure the system's specific contribution to site performance improvement	TENOVA	April 29 3:00-4:30 pm	20
Use of the training simulator: Session I	Use of the training simulator developed within the project: Part I	UNICL	May 22 2:00-3:00 pm	40
Use of the training simulator: Session II	Use of the training simulator developed within the project: Part II	UNICL	May 26, 2:00-3:00 pm	40

2.15 Revision of the dissemination strategy and plans for dissemination beyond project conclusion

Overall, the dissemination strategy established in the Dissemination and Communication plan (*Deliverable D6.2*), proved to be effective, and the Consortium was proactive in implementing it. Nonetheless, in the third year of the project it became evident that the established target values for some dissemination KPIs were overambitious a not realistically achievable in the time frame of the project and with the given budget. Therefore, a twofold approach has been implemented, also considering that some outcomes of the project became available only in the last month:

A. The target values of some KPIs were decreased. In particular:
    - The target number of presentations/posters discussed in international scientific events was decreased from 40 to 15.
    - The target number of articles in well reputed scientific Journals in Open Access mode was decreased from 6 to 3.
B. The Consortium planned some dissemination actions spanning one year after the official project conclusion. In particular,
    - Sim4Future will provide a presentation focused on training and autonomous vehicles in hazardous environments including steelworks at the *18th International MODSIM World Conference*, Alexandria (Virginia, USA) August 18-19, 2026.
    - Sim4Future also plans to continue some experimentations and Siderpotenza, and plance to produce a conference/journal publication once enough data will be gathered for the experiments.
    - SSSA plans to submit one paper to a Journal related to the AI-based anomaly detection strategy from process data, which was preliminarily presented at EEC 2026, as more experiments have been carried out in the last month of the project, whose outcome is not yet published.
    - SSSA is partner of the Erasmus+ project entitled "*Skills Alliance for the Green, Digital and Social Transformation of the Energy Intensive Industries*" (SKILLS4EII – G.A. 101184954), which analyses, among other topics, the demands for new training solutions for Energy-Intensive Industries, including the steel and engineering sectors. SSSA already identified iSteel-Expert as exemplar solution to support upskilling of personnel in the EAF area and will involve some partners of the Consortium in some meetings to showcase the experience and find further opportunities to exploit the project outcomes.

Moreover, the Consortium realized that the KPI "No of downloads for the published papers overall" was not meaningful, as not all the publishers provide access to this number. For instance, in the case of the paper published by SSSA and Tenova on the Journal *La Metallurgia Italiana*, this figure is not available. Therefore, the decision was taken to eliminate this KPI.

2.16 Achievement status of the established dissemination targets

The dissemination actions which were carried out in the third year enabled a good progress in the achievement of most target values for the Key Performance Indicators (KPIs) of dissemination actions established within the Dissemination and Communication plan (Deliverable D6.2), such as summarised in **Table 1**. In particular, the ESTAD 2025 and the AISTech 2026 Conferences and Exhibitions proved to

be very effective and generated relevant feedback on the project, thanks to their huge and qualified audience and to the presence of TENOVA also as exhibitor. Moreover, the strong visibility of the project at the very relevant EEC 2026 conference and exhibition, where the Final Project's Workshop took place and a booth dedicated to the project was established (see Subsection 3.4) provided a further contribution to spreading the project outcomes. Nonetheless, the target values for 3 of the established KPIs were not achieved, but the Consortium is keen to implement actions which can allow achieving them after the project conclusion.

Table 3. Comparison between target and actual values of the established KPIs for the dissemination activities.

Dissemination activity	KPI Dissemination	Target	Current value	% vs target	Status
Scientific and technical papers	No of articles in well reputed scientific Journals in Open Access mode.	3	1	33%	✗
Presentations, lectures, posters in conferences, congresses and workshops	No of papers published in proceedings of international conferences and workshops	10	10	100%	✓
	No of presentations/posters discussed in international scientific events	15	17	113%	✓
	No of persons in the general audience reached in the attended scientific events	5000	≈20300	406%	✓
Internal seminars and dissemination events	No of internal partners' events;	5	5	100%	✓
	No of pilot training sessions related to the outcomes of the project and some of the developed tools	3	3	100%	✓
Webinars and seminars on iSteel-Expert outcomes	No of webinars and seminars	3	4	125%	✓
	No of persons overall attending the held webinars and seminars	150	75	50%	✗
Presentations in events promoted by EU initiatives, platforms, and associations	No of presentations	2	2	100%	✓
	No of experts and industrial representatives reached in the presentation events	100	255	255%	✓
Collaboration and synergies with other CSP and HEU projects	No of projects contacted for potential synergies in terms of knowledge exchange and future project scale-up	5	3	60%	✗
	No of joint activities put in place with some of the previously identified and contacted projects	2	1	50%	✗
iSteel-Expert final Workshop	No of presentations held during the Workshop both by iSteel-Expert beneficiaries and by external experts	5	6	120%	✓
	No of attendees	100	120	120%	✓

3. Communication activities

Communication activities mostly aim at **promoting the project itself and its impacts among the identified groups**. The following main Communication Objectives (CO) were defined:

- CO1. to raise awareness in the steel community of the benefits of the iSteel-Expert technologies and solutions in terms of socio-economic and environmental sustainability of the steel production cycle;
- CO2. to raise awareness and favour opportunities for transferability of concepts;
- CO3. to raise awareness among European Commission (EC), Public Authorities and policymakers to foster cooperation in spreading the benefits of the iSteel-Expert outcomes and solutions;
- CO4. to involve workers and young talents in further development and deployment of the iSteel-Expert tools and solutions and create among them awareness on their impact by also promoting connected career opportunities;
- CO5. to promote gender equality and integrate gender dimension in research and innovation activities.

Based on the strategy elaborated at the very beginning of the project, the communication activities implemented by the iSteel-Expert Consortium aimed at raising awareness of the project objectives and benefits in the steel community, providing updated information on research activities and outcomes and informing about dissemination events attended by the Consortium members. All communication actions are intentionally focuses on technical objectives, activities, and results of the project.

The communication strategy mostly exploited the project website, the social media LinkedIn and some presentations made by single partners on more general topics connected to iSteel-Expert. Moreover, in the second year of the project, 2 newsletters and 3 press releases were issued.

3.1 Project website

The iSteel-Expert website (https://www.isteel-expert.eu/) is online since December 2023. It registered about 2500 total views (about 7800 events) from 850 different users mostly from Europe and North America. **Figure 5** shows the time trend of the visits of the website since the first day it was online until June 2025, while **Figure 6** shows the geographical distribution of the visitors of the project website.

Figure 5. Time trend of the number of visitors of the project website starting from 01.12.2023.

Figure 6. Geographical distribution of the visitors of the project website.

From the website, about 4750 document downloads were registered, among which 2220 downloads of the project newsletters.

The project website was updated by adding news whenever applicable and by making available public documents, such as public deliverables, newsletters and brochures. One subsection was added to the publication section, which is dedicated to the videos.

3.2 LinkedIn Account

A LinkedIn account was created for the project at the end of July 2023 (see also *Deliverable D6.2*) and at the date of delivery of the present documents holds 1560 followers. 43 posts were published, which gathered a total of more than 41500 impressions and 135 reposts. The time trend of the visitors who accessed the iSteel-Expert page on LinkedIn (based on the LinkedIn analytics) is shown in **Figure 7**, while the distribution of their sectors is shown in **Figure 8**.

Figure 7. Time trend of the visitors of the LinkedIn page of the project.

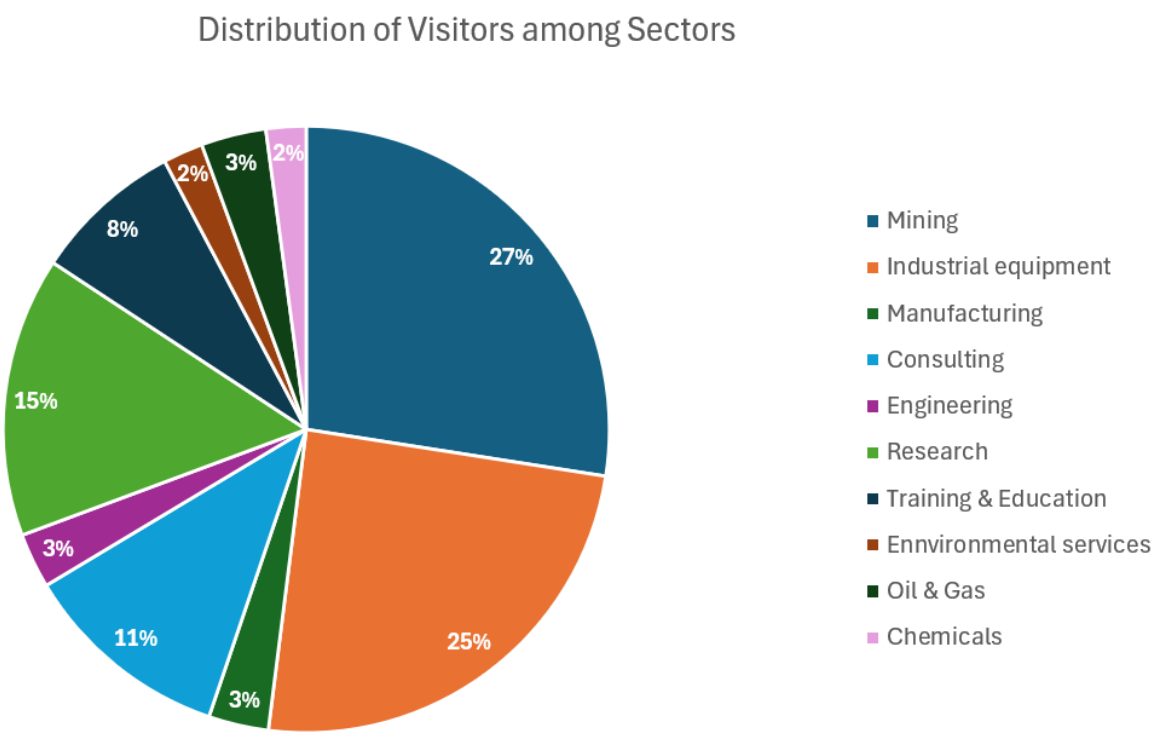

Figure 8. Distribution of the visitors among sectors of the LinkedIn page of the project.

3.3 Newsletters, press releases and videos.

In line with the target established in the Dissemination and Communication plan, a total of 3 newsletters were issued in the third year of the project, focusing on different aspects of the work carried out by the different members of the project Consortium.

Overall, 7 Newsletter were issued along the project duration.

Moreover, the following 3 press releases were issued:

1. an article in Italian entitled *"L'intelligenza artificiale entra nell'acciaieria: sicurezza e innovazione con il progetto iSteel-Expert"* published by Tenova in December 2025 on *Open Innovation,* an online platform of Regione Lombardia dedicated to innvoation. The article is available online at https://www.openinnovation.regione.lombardia.it/en/news/news/8942/l-ai-entra-in-acciaieria-pi-sicurezza-e-innovazione-con-il-progetto-is and its English translation is provided in **Appendix II**.
2. An article in French entitled "*iSteel-Expert, un jumeau numérique qui accompagne l'industrie sidérurgique*" published by UCL in March 2026 on *Twin+*, an online information and community portal in French entirely dedicated to digital twins, artificial intelligence and immersive technologies such as virtual reality. The article is available online at https://www.twinplus.fr/articles/63663b16-a517-f111-8332-6045bd954af1/isteel-expert-un-jumeau-numerique-qui-accompagne-l-industrie-siderurgique- and its English translation is provided in **Appendix III**.

3. An article in Italian and English published at the beginning of July 2026 online on *Sant'Anna Magazine*, the official online publication of SSSA. The article is available online at https://www.santannapisa.it/it/news/progetto-isteel-expert

As far as the publication on EC communication means is concerned, SSSA contacted the Project Officer for support, an online meeting was held and a submission is being panned covering several RFCS projects.

Overall, 6 press releases were issued along the project duration, in line with the established target.

Finally, 3 videos have been realised by SSSA

- Two videos were realised by April 2026 to equip the iSteel-Expert's booth at the exhibition held during the EEC 2026 Conference (see **Subsection 3.4**). Video No 1 provides an overview of the different components of the iSteel-Expert solution and was built by merging videos and presentations provided by all the members of the Consortium. Video No 2 focused on the iSteel-Expert solution for monitoring and presented the data gathering tool, the iSteel-Expert dashboards and the Artificial-Intelligence-based processing of images and videos that have been investigated throughout the project.
- the third Video was realised in June 2026 starting from Video No 2 and focusing on the different ways Artificial Intelligence was applied in the project, to accompany the above-listed press release No 2 published on Sant'Anna Magazine.

All the Videos were revised and approved by the coordinator before publication and are now publicly available on a dedicated subsection of the project's website.

3.4 iSteel-Expert's booth at EEC2026

In the occasion of the Conference EEC 2026, where the final workshop of the project was held, Tenova organised a booth completely dedicated to the project, where the different partners of the project could present and discuss the project results with all the participants to the conference (see **Figure 9**). The booth was equipped with a screen, where two videos realised by SSSA where continuously run.

Figure 9. The iSteel-Expert's booth at the EEC 2026 exhibition.

3.5 Revision of the communication strategy and plans for dissemination beyond project conclusion

Such as for dissemination, also for communication activities the strategy established in the Dissemination and Communication plan (*Deliverable D6.2*) overall proved to be effective, and the Consortium was proactive in implementing it. Nonetheless, in the third year of the project it became evident that the established target values for some communication KPIs were overambitious a not realistically achievable in the time frame of the project and with the available budget. Therefore, such as for dissemination activities, a twofold approach has been implemented, also considering that some outcomes of the project became available only in the last month:

A. The target values of some KPIs were decreased. In particular:
    - The target number of views of the project website was decreased from 10000 to 2500.
    - The KPI "No of persons in the total audience reached" turned out to be difficult to compute differently from the No of views, therefore it was eliminated, being redundant.
    - The target number of readers of the project's newsletters was decreased from 5000 to 4000.
    - The target number of social media followers was decreased from 3000 to 1500.
    - The target number of exhibitions or trade fairs attended was decreased from 6 to 4.
B. The Consortium planned some communication actions spanning one year after the official project conclusion. In particular:
    - SSSA will keep on following the submission of a joint publication on EC communication means.
    - The project webpage and LinkedIn account will remain active and Tenova and SSSA are committed to vitalise them with posts related, for instance, to further exploitation or dissemination actions (e.g. new papers) concerning the project outcomes.
    - The academic partner will keep on using some of the project outcomes in their lessons and seminars devoted to undergraduate and PhD students.

3.6 Achievement status of the established communication targets

Table 4 present the final value of the established KPIs for communication activities and compares them with their target values. Such as for dissemination, also for communication activities the actions which were carried out in the third year enabled a good progress in the achievement of most target values for the Key Performance Indicators (KPIs) of communication established within the Dissemination and Communication plan (Deliverable D6.2).

Table 4. Comparison between target and actual values of the established KPIs for the communication activities.

Communication activity	KPI Communication	Target	Actual value	% vs target.	Status
Project website with dedicated contents. Link to partners' website. Sharing public deliverables, reports, and training material	No of views by M34	2,500	2500	100%	✓
	No of documents downloads	1,000	4750	475%	✓
Newsletters and bulletins	No press of releases with news, events, and information of interest (target 2/y)	6	7	117%	✓
	No of newsletters with news, events, and information of interest (target 2/y)	6	7	117%	✓
	No of readers	4,000	≈4000*	100%	✓
Production of communication material	No of leaflets/brochures produced in the project.	2	2	100%	✓
	No of videos generated during the project.	2	3	150%	✓
Press releases to newspapers and social media.	No of social media followers	1,500	1560	104%	✓
	No of persons in the reached audience	5,000	≈16000#	320%	✓
Presentations in events organized by or relevant to EU, platforms, and associations. Publications on EC's communication channels	No of clustering events at EU level	1	2	200%	✓
	No of publications on EC communication means	1	0	0%	✗
Attendance to exhibitions/trade fairs	No of exhibitions or trade fairs attended	4	4	100%	✓
	Overall No of persons in the audience of the attended exhibitions and trade fairs	2,500	≈19000	760%	✓
Communications and seminars dedicated to students and young minds	Overall no of students reached	300	20	7%	✗
Communications and seminars dedicated to gender equality	No of presentations on gender equality in project event	1	1	100%	✓
	No of sessions on career opportunities	1	0	0%	✗

* This value is estimated from the newsletters downloads from the website and assuming that 20% of the impressions of the LinkedIn posts containing the newsletters and the press release correspond to readers of the document.

This value is computed by summing the number of visitors of the LinkedIn account, the views of the press releases and 5% of the readers of the newspaper "Il Tirreno" in its paper and online version (≈12300).

4. Conclusions

In the last year of the project the iSteel-Expert consortium strongly intensified the Dissemination and Communication activities, by focusing on presentation in conferences, seminars and webinars.

The Final project Workshop was organised in a very successful way in the context of a major conference in the field and was animated by very interesting discussion with experts in the steel field, by gathering a very good feedback on the project achievements.

As some of the outcomes of the project were validated in the last months of the project, the publication on scientific journal was less intense than foreseen, but especially the academic members of the Consortium are committed to fill this gap also beyond the project duration, as this aspect is fully aligned with their institutional mission.

Overall, the elaborated Dissemination and Communication plan proved to be effective, although some of the target values established for the selected Dissemination and Communication KPIs turned out to be very ambitious and had to be decreased. In general, the partners showed a very positive and collaborative attitude in spreading research objectives, ambitions, concepts and outcomes.

This enabled a consistent progress on the achievement of the established target values of some of the identified KPIs for Dissemination and Communication.

The Consortium is keeping on disseminating and communicating the project outcomes as well as seeking connections and identifying opportunities for synergies with other ongoing and future EU-funded research initiatives.

5. Appendix I – Information on attended Dissemination events

6.1 ESTAD 2025

Event information	
Event name (and acronym)	7th European Steel and Application Days (ESTAD 2025)
Type of event	Conference and Exhibition
Date	October 6-9, 2025
Location	Verona (Italy)
Geographic coverage	Europe
Type of audience	Steel Companies, OEMs, RTOs, Academia.
Approximate size of audience	870

Short description	Since 2015, ESTAD is the major European conference focused on steel, and is widely known as great opportunity for all actors in the sector to meet, exchange their ideas, perform fruitful discussion and create new professional relationships involving technology providers, suppliers, producers and customers. The event is focused on the technological advances, changes of the supply chain involving the raw materials and energy sources, transformation of the production processes and plants to accomplish the twin transition (ecological and digital) and the new perspective of steel application.
	The conference topics were:
	• Ironmaking
	  ○ Cokemaking
	  ○ Sintering and pelletising
	  ○ Blast furnace ironmaking
	  ○ Direct reduction and smelting reduction
	• Steelmaking
	  ○ Oxygen steelmaking
	  ○ Electric steelmaking
	  ○ Continuous casting, near-net shape casting and ingot casting
	• Steel materials and their applications, additive manufacturing, surface technologies
	• Hydrogen-based steelmaking, CO_2 mitigation, transformation / environment /energy
	Digital transformation.

Information about dissemination activity	
Presentation title	AI-Powered IT Infrastructure for Enhanced Safety in EAF Operations
Presenter	Valentina Colla (SSSA)
Other partners involved	Tenova
Hashtag(s) for Social Media	#steel #research #metallurgy #EAF #Artificialintelligence #machinelearning #RFCS #IndustrialInnov
Attachments (e.g. agenda, invitation)	Program of the event

7th European Steel Technology and Application Days - ESTAD 2025

lunedì 6 ottobre 2025 - giovedì 9 ottobre 2025

Palaexpo Veronafiere

Programma

Indice

lunedì 6 ottobre 2025

Registration (16:00 - 18:30)

martedì 7 ottobre 2025

Registration (08:00 - 09:00)

Opening session - Auditorium Verdi (09:00 - 10:20)

-Coordinatori: Christian Bernhard; Carlo Mapelli

time	[id] title	presenter
09:00	Welcome addresses by AIM President and Conference chairpersons	
09:20	[482] The Steel Industry in the Mediterranean Area: Challenges, Opportunities and Enabling Technologies	Sig. MARESCHI DANIELI, Giacomo
09:40	[478] Making Steel Great Again: U.S. Steel Production in the Trump Era	ASHBURN, Ronald
10:00	[469] The Production Mix of Chinese Steel Industry and the Technical Efforts Toward Carbon Neutral	TIAN, Zhiling

Coffee break (10:20 - 10:50)

Alternative Reduction Methods & Waste Utilization - Vivaldi (10:50 - 12:50)

1.4.1

-Coordinatori: F Cirilli

time	[id] title	presenter
10:50	[154] Circored as a Pre-Reduction Step for Low-Grade Iron Ores	DIETZIG, Jonas
11:10	[208] Decarbonization of industrial high-temperature processes with an innovative Electric Gas Heating	Sig. CASTELLI, Andrea
11:30	[298] Clean iron production by self-reducing agglomerates made in biochar and mill scale: a comparison in reduction efficiency as a function of biochar quality and properties	Dr. DALL'OSTO, Gianluca
11:50	[284] Enhancing Steelmaking Waste Utilization through Electric Smelting Furnace Technology	JOUBARANI, Kamal
12:10	[419] Comparative Analysis of CO and H2 Reduction Mechanisms in Electric Arc Furnace Dust	SHPILEVAIA, Eleonora
12:30	[422] Electric Smelting Furnace Technology for Green Steelmaking	CHOMYN, Kyle

Circular Economy & Industrial Symbiosis - Respighi (10:50 - 12:10)

5.3.1

time	[id] title	presenter
10:50	[146] Hurricane – Sector coupling hub for circular use of thermal and industrial waste	Sig. ALBOORT, Philippe
11:10	[377] Recent achievements of Industrial Symbiosis in the steel sector based on the Symbio-Steel project	Prof. COLLA, Valentina
11:30	[428] Upgrading of low-quality iron ores and mill scale with low carbon technologies	HUBRICH, Martin
11:50	[406] Assesment of the natural absorption of CO2 performed by steelmaking slag	Prof. MAPELLI, Carlo

Continuous Casting Process Fundamentals & Defect Analysis - Salieri (10:50 - 12:50)

2.3.1

-Coordinatori: Marten Sprecher

time	[id] title	presenter
10:50	[7] Analysis of Center Segregation Induced by Density Changes and Shrinkage Cavities Using a Moving-Slice Model in Continuous Casting	Dr. LEE, Joodong
11:10	[36] Predicting the risk of surface defects in continuous casting with advanced measurements and artificial intelligence	SUNDBERG, Jill
11:30	[105] Influence of different C, Ti, B, Mn, and Al content on hot ductility behavior of two micro-alloyed steel at different strain rates	BAKHTIARI, Saeid
11:50	[135] Influence of the cooling strategy on the intergranular crack formation during continuous casting of TRIP steels produced from low-grade scrap	LITTRINGER, Robert
12:10	[329] A novel approach to cracking criteria in continuous casting	ANDERSSON, Nils
12:30	[187] The effect of continuous casting conditions on the mechanical properties of low-carbon steel wire rods	BALDUSSI, Federico

Hydrogen-Based Direct Reduction (H-DRI) - Margherita I (10:50 - 12:30)

5.1.1

-Coordinatori: Klaus Krüger

time	[id] title	presenter
10:50	[124] Flexible direct reduction of iron ore with Natural Gas and Hydrogen - Potential and perspectives of the new SALCOS demonstration plant µDRAL in Salzgitter	Dr. JUCHMANN, Peter
11:10	[198] Carburization with methane of different iron-bearing oxide pellets reduced by hydrogen	KAR, Manish Kumar
11:30	[277] Models for simulating gas and energy management in the transition of integrated steelworks to high hydrogen direct reduction-based processes	Dr. MATINO, Ismael
11:50	[359] Safe H-DRI: advancing the production, transport and storage of Hydrogen-based Direct Reduced Iron (H-DRI) for sustainable steelmaking	ALEMANNO, Valentina
12:10	[400] Kinetics of Direct Reduction of iron ore pellets: understanding rate-limiting steps in hydrogen-based reduction of low- and high-grade pellets	CIRILLI, F

Raw Material Optimization & Scrap Management - Auditorium Verdi (10:50 - 12:30)

2.2.1

-Coordinatori: Cosmo Di Cecca

time	[id] title	presenter
10:50	[25] The effect of hot heel condition on EAF operations with HBI bucket charging	LEE, JM
11:10	[60] Melt Shop Production Management with Comprehensive Raw Material Optimization	Dr. SCHLAUTMANN, Martin
11:30	[168] Study on the Effect of Direct Reduced Iron on the Nitrogen Content in Electric Arc Furnace Steelmaking	Dr. CHEN, Zhao-ping

11:50	[346] Optimization of scrap mix in EAF steelmaking	FERRO, Sergio Pablo
12:10	[381] Bucket Loading and Scrap Yard Logistics Simulation - Optimizing Material Flow and Enhancing Efficiency	UHL-HÄDICKE, Paul

Rolling Mill Technology & Process Optimization - Margherita II (10:50 - 12:50)

3.1.1

-Coordinatori: Ettore Anelli

time	[id] title	presenter
10:50	[150] Work Roll Cooling Optimization	HNIZDIL, Milan
11:10	[18] Optimisation of CSP hot rolled structured steels based on Nb micro-alloying to reduce costs and GWP	LALLEY, Paul
11:30	[35] Real-Time Work Hardening Evaluation for Optimizing Hot Rolling Schedules and Power Demand in HSLA Steel Production	Dr. FERRAIUOLO, Alessandro
11:50	[64] Advanced Load Sharing Control for Roller Straightening of Long Products	VAN PUTTEN, Koos
12:10	[42] Optimisation of roll cooling and descaling processes at Erdemir HSM#2	WOLFF, Robert
12:30	[66] X-Pact® Total Roll Gap Control (TRC®): Improvement of yield and reduction of non-productive time at CCM® Marcegaglia	Sig. KOCH, Markus

Surface Technologies - Mozart (10:50 - 12:50)

4.3.1

time	[id] title	presenter
10:50	[275] High temperature oxidation in steel processing under different process conditions, atmospheres and rising levels on tramp elements	PRESOLY, Peter
11:10	[156] ON-LINE STEEL SURFACE CONTAMINATION MONITORING WITH LIBS-BASED SENSOR	EGNER, David
11:30	[88] Energy- and Space-Saving Electrolytic Cleaning with SMS group Pulse Nozzle Technology	Dr. WOLFF, Hanna
11:50	[405] On-line laser cleaning of skin pass rolls	SYMENS, Gaëtan
12:10	[62] Oiling of Steel Strip: A New, Intelligent Oiling Machine Combines Electrostatic Oiling With High-Precision Oil Film Measurement, Ensuring Higher Process Security and Lower Oil Consumption	FIEWEGER, Martin
12:30	[205] Plasma Nitriding of Vanadium-Alloyed Air-Hardening Ductile Steels	Dr. SCHMIDT, Rolf

Waste Processing & Byproduct Utilization - Respighi (12:10 - 12:50)

5.3.2

time	[id] title	presenter
12:10	[261] Technical Considerations in the Design of Capture Systems to Control Fugitive Releases in Ironmaking and Steelmaking	Dr. JENNES, Ralf
12:30	[177] Sensor solutions for online analysis of post-consumer scrap	Dr. PETERSSON, Jonas

Lunch (12:50 - 13:50)

The Steel Industry – Setting the Standard for the Twin Transition - Auditorium Verdi (13:50 - 14:20)

- Relatore: Dr. FLEISCHANDERL, Alexander

Time to change rooms (14:20 - 14:30)

Continuous Casting Process Fundamentals & Defect Analysis - Salieri (14:30 - 15:30)

2.3.1

-Coordinatori: Riccardo Carli

time	[id] title	presenter
14:30	[147] The Impact of Cu, Sn, and Ni on Surface Cracking in Continuous Casting	GAISER, Georg
14:50	[161] Reduction of emissions at casters cooling chamber.	WILHELMI, Arndt
15:10	[128] Characteristics and Control of Oxide–Sulfide Complex Inclusions in D2 High-Speed Railway Wheel Steel	Dr. BAO, Daohua

Direct Reduction Process Optimization - Vivaldi (14:30 - 16:10)

1.4.2

time	[id] title	presenter
14:30	[33] Improving Direct Reduction Operation efficiency through Roller Screen technology	GONÇALVES ANDRADE, Alexandre
14:50	[37] Pellet reducibility index management range for direct reduction plant	LEE, Dong Soo
15:10	[111] Hot DRI Material Gate – A smart product for green steelmaking in a digitalized future	Sig. DE MATTEIS, Jérôme
15:30	[372] Key measurement technologies for direct reduction ironmaking	Sig. RODRIGUES, Filipe
15:50	[312] Carbothermic reduction of hot rolling sludge by rice husk char with microwave heating	Sig. TOKUNAGA, Tshubasa

EAF Design & Power Supply Optimization - Auditorium Verdi (14:30 - 16:10)

2.2.2

-Coordinatori: Carlo Mapelli

time	[id] title	presenter
14:30	[6] Improved EAF performance by optimized high current system design	RIEDINGER, Dirk
14:50	[32] Direct Feed Power Supply to enhance power quality and EAF KPI	SANCHEZ, Mathieu
15:10	[271] Next Generation Power Supply Options for Electric Arc Furnaces and Electric Smelting Furnaces	CHOMYN, Kyle
15:30	[94] Latest SMS EAF technologies for safety and green steel production	Sig. LUGNANI, Massimo
15:50	[122] NEW GENERATION IN PRE-HEATING TECHNOLOGY FOR ELECTRIC STEEL MAKING HIGHER PRODUCTIVITY WITH REDUCED POWER	Sig. OZAL, Bahadir Sig. ERTAS, dogan

Hydrogen-Based Direct Reduction (H-DRI) - Margherita I (14:30 - 16:10)

5.1.1

-Coordinatori: Enrico Malfa

time	[id] title	presenter
14:30	[313] Flexible operation of DRI plants integrated with high-temperature electrolysis for cost-effective decarbonization of iron production	FICILI, Marco
14:50	[357] Real laboratory 'H2Stahl' for hydrogen-based direct reduction	Dr. WOLTERS, Ralf
15:10	[214] An integrated approach to steelmaking decarbonization: HYDRA project. Description of the innovative open platform and first results	Sig. CIRILLI, filippo
15:30	[421] Results from the HySteel project: integration of solid oxide electrolysis into direct reduction iron systems	SCACCABAROZZI, Roberto
15:50	[473] Calix's Zero Emissions Steel Technology (ZESTY): Breakthrough pilot testing results for the Hydrogen Direct Reduced Iron (H-DRI) process	VAN DORP, Sebastiaan

Rolling Mill Technology & Process Optimization - Margherita II (14:30 - 16:10)

3.1.1

-Coordinatori: alessandro ferraiuolo

time	[id] title	presenter
14:30	[98] Danieli Quali-HSM®: the next gen HSM process	Sig. COMELLI, Antonio
14:50	[115] Latest developments in MIDA technology	DE LAURA, Nicolò
15:10	[113] Multi-functional Simulation System for Continuous Hot Bar Rolling: Development and Industrial Application	Sig. GUO, SHUO
15:30	[83] Transforming Steel Manufacturing: Innovations and Achievements in Direct Casting and Rolling	Sig. KINTSCHER, Björn
15:50	[84] The art of keeping up with latest hot strip mill technology – upgrade success stories	GUMBINGER, Hartmut

Surface Technologies - Mozart (14:30 - 16:10)

4.3.1

-Coordinatori: Giovanni Bolelli

time	[id] title	presenter
14:30	[24] Modification of Diamond Like Carbon (DLC) to improve specific tribological characteristics for automotive steel components	ROMAGNOLI, Denis
14:50	[86] Advancements and future prospects of zero emission galvanizing technologies	Dr. KRETSCHMER, Matthias
15:10	[34] Investigation on the use of organic acids to pickle the oxide scale of carbon steel hot rolled strips	Sig. FLAMENT, Sebastien
15:30	[375] Innovative "Scale Free" Furnace for section rolling mill	TIMOSSI, Pietro
15:50	[197] Advanced Coating Thickness Measurement in Electrical Steel Manufacturing with EMG SOLID® DFT	KRESO, Mark

Waste Processing & Byproduct Utilization - Respighi (14:30 - 16:10)

5.3.2

-Coordinatori: Giordano Streghi Montauti

time	[id] title	presenter
14:30	[444] EAF waste gas cleaning through iRecovery® system and CataFlex™	Sig. ZECCHINATO, Luca
14:50	[327] Predicting the Reduction Kinetics of the Electric Arc Furnace Dust - A Machine Learning Approach	KEUSCHNIG, Aaron
15:10	[302] Smart robotic system for scrap sorting	RUSU, ION
15:30	[461] Technological solutions for pollutants abatement in Steel Meltshop fumes	Sig. MILOCCO, Alessio

Mold Technology & Nozzle Performance - Salieri (15:30 - 16:10)

2.3.2

-Coordinatori: Riccardo Carli

time	[id] title	presenter
15:30	[193] Concepts for the development of carbon free mold powders for the continuous casting of steels	GRUBER, Nathalie
15:50	[159] Continuous Casting Mold Flow with Original and Used Nozzle Geometries: Numerical Flow Simulations and Water Model Measurements	JAVUREK, Mirko

Coffee break (16:10 - 16:40)

Blast Furnace Process Optimization & Control - Vivaldi (16:40 - 19:00)

1.3.1

-Coordinatori: Gert Nilson

time	[id] title	presenter
16:40	[112] Implementation of EASyMelt with Ammonia and HBI Charging to Achieve Ultra Low Carbon Ironmaking	Sig. MAURET, Florent
17:00	[216] AI-Powered Cohesive Zone Optimization: Enhancing Efficiency and Stability in Blast Furnaces	Dr. WACHLMAYR, Johann
17:20	[232] Breaking boundaries: Tata Steel's H Blast Furnace sets new standards	Sig. CASTAGNOLA, Cristiano
17:40	[195] Reducing blast furnace CO2 emissions	Dr. LONG, Edward
18:00	[322] Monitoring of blast furnace wall pressure profiles and their relation to process efficiency	BARTUSCH, Hauke
18:20	[8] Campaign Life Extension of Hot Stoves in Blast Furnace Ironmaking	SAMUEL, Steven
18:40	[109] Deep Learning Model to Predict the Remaining Time to Close Tap-holes for Blast Furnaces	Dr. LEE, Seungmoon

Green Steel Technologies - Respighi (16:40 - 19:00)

5.3.3

-Coordinatori: Jens Kempken

time	[id] title	presenter
16:40	[10] Globalization cancelled?	Sig.na VOIGT, Nicole

17:00	[53] Thick Slab Casting Technology for renewable energy produced by windmills	Dr. WANS, Jochen
17:20	[376] Sustainable biogenic carbon for metallurgical use	Sig. NYLUND, Erland
17:40	[201] Transitioning to Green Steelmaking: Environmental Considerations of Electric Arc Furnaces	STEINPARZER, Thomas
18:00	[443] Production of hydrogen-rich synthesis gas for blast furnace injection by exploiting coke breeze combustion to reform coke oven gas.	Sig. GILI, MATTEO
18:20	[78] Yield increase by hot strand coating in continuous casting of long product	HAUENSTEIN, Gian
18:40	[398] Application of a novel biowaste-derived biocoal as coal substitute in Electric Arc Furnace	Sig.ra ALEMANNO, Valentina

Hydrogen-Based Steelmaking Technologies - Margherita I (16:40 - 19:00)

5.2.1

-Coordinatori: Enrico Malfa

time	[id] title	presenter
16:40	[203] Hydrogen Reduction of Manganese and Iron Oxides in a Commercial Manganese Ore: Thermochemistry and Kinetics	SARKAR, Alok
17:00	[96] Ammonia as a Cost-Effective Energy Carrier for Decarbonization in the European Steelmaking Industry	Sig. JI, Jihong
17:20	[194] Electrification of heating in steelmaking – an enabler of fossil-free steel	Dr. CHANDRASEKARAN, Dilip
17:40	[67] Hydrogen plasma smelting reduction of Cr2O3/Chromite: the first step to direct and sustainable production of stainless steel	JAFARZADEH, Mohammad
18:00	[50] Development and Testing of a Hydrogen-Fueled Burner-Injector System for EAF Applications: A Clusters4Future Initiative	Dr. KRAUSE, Fabian
18:20	[229] Replacing natural gas with Hydrogen in heat treatment furnaces: impact on scale formation, surface quality and pickling kinetics of stainless steel	MASSARELLI, Niccolo
18:40	[484] Advancing hydrogen plasma smelting reduction: Experimental insights from a pilot plant	ADAMI, Bernhard

Mold Technology & Nozzle Performance - Salieri (16:40 - 19:00)

2.3.2

time	[id] title	presenter
16:40	[365] The interplay of SEN design and flow dynamics in thin and mid slab casting	HACKL, Gernot
17:00	[129] Characteristics of Nozzle Clogging and Evolution of Oxide Inclusion for Al-Killed Super304H Stainless Steel	QIAO, Tong
17:20	[250] BORON IN CASTING POWDER: INSIGHTS FROM PROSIMET STUDIES	ALLONI, Marco
17:40	[68] Advancing Mold Monitoring by Integrating Thermal Analysis and Material Insights with respect to the hot crack susceptibility	Sig. KRASILNIKOV, Artemy
18:00	[234] Arcelormittal Industeel slab caster conversion to ODS fibers with the Fiberstrand® technology.	Sig. D'HAUTCOURT, Frédéric

18:20	[465] Cu+: A New Standard in Slab Mould Plate Design for Cost-Effective Steel Production	Dr. BEEL, Alexander
18:40	[211] Case study on the improved reliability and efficiency of the HD moldFO+ fiber optic mold monitoring system	SIX, Stephan

Refractories & Sustainability - Auditorium Verdi (16:40 - 19:00)

2.2.3

-Coordinatori: Roberto Peri

time	[id] title	presenter
16:40	[297] Highly efficient technologies for increased yields in steelmaking processes and reduced environmental impact	Prof. GLASER, Björn
17:00	[283] Enhancement of tramp elements removal from liquid iron by molten oxysulfide electrolysis	AMBIRU, Masahiro
17:20	[222] Low Carbon Footprint EAF Refractories to support Scope 3 emissions reduction and the overall European green steel transformation	DIEGUEZ SALGADO, Uxia
17:40	[471] Recent Advances in Refractory-Maintenance and Safety for Steel Plants with the help of 3D-Laser-Scanning, Digitalization and Gunning-Robot-Systems	Sig. WELLING, Martin
18:00	[356] Life Cycle Assessment for the electric steelmaking route in the ALCHIMIA project	Dr. ROSSI, Federico
18:20	[348] INNOVATIVE APPROACH IN STEELMAKING REFRACTORY APPLICATIONS	Sig. BUCHBERGER, Bernd
18:40	[292] Metallic Elements Dissipation Avoided by Life cycle design for Steel – MEDALS project	Prof. GLASER, Björn

Rolling Mill Technology & Process Optimization - Margherita II (16:40 - 18:40)

3.1.1

-Coordinatori: Silvia Barella

time	[id] title	presenter
16:40	[125] SBQ Sizing - Free of charge	Sig. SCHNELL, Guenther
17:00	[181] Wave Control Using Machine Vision in the Finishin Mill	JUNG, jinwoo
17:20	[311] The best knows no limits! It's time to challenge the ESP sequence lengths	BAUMGARTNER, Kerstin
17:40	[191] The application of bar cooling technology to plate mills for throughput and utilization improvements	Dr. ROBINSON, Ian
18:00	[244] Smart controlled actuator to homogenize the temperature of the transfer bar	ADRIAEN, Pepijn
18:20	[182] A Study on enhancing accuracy of AI-based RDT automatic control in hot rolling process	YUN, Daeho

Surface Technologies - Mozart (16:40 - 18:40)

4.3.1

-Coordinatori: Giovanni Bolelli

time	[id] title	presenter
16:40	[389] Improving sustainability of Cold Rolling of Low-Carbon Steels via Oil Free Lubricants	Prof. COLLA, Valentina
17:00	[167] High Turbulence Pickling	FLAMENT, Sebastien
17:20	[458] Optimization of Stainless Steel Cold Rolling Lubrication Through Thermal Modeling	Sig.na ELHAJJ, Cynthia
17:40	[470] Design and advantages of a hybrid furnace combining gas burners and induction heating	Prof. MAPELLI, Carlo
18:00	[153] Hot strip surface quality improvements by: Work roll lubrication and cooling package for hot strip mills with a new special feature for a continuous lubrication	MITTLBÖCK, Simon
18:20	[81] X-Pact® Solid Control – process optimization, quality control and root cause analysis in case of abnormalities in the cast product	Sig. WILMES, Ronald

Poster Session - _Foyer (19:00 - 20:30)

[id] title	presenter	board
[49] Optimizing Biomass Gasification-Driven Carburization for Carbon-Neutral Hydrogen-Based Steelmaking	LEE, YUBIN	
[133] The Effect of Crystallization Temperature on the Properties of Silicon Manganese Slag Cast Stone	Sig. HUANG, Yi	
[155] Advancing Sustainability in Continuous Casting of Steel Strategies for Productivity, Traceability, and Waste Reduction	NACLERIO, Angelo	
[212] Prediction and controlling of strip buckling during industrial continuous annealing process	Dr. LI, Ruowei	
[224] Effect of Magnesium Deoxidation on Non-Metallic Inclusions in Austenitic Stainless Steel	CHANG, Min Kwan	
[240] Development of an AI model to optimize cooling conditions for hot-rolled coils from the down coiler to the storage yard to minimize material properties deviations in high-strength steel	Dr. KANG, Youn-Hee	
[287] Technical Overview of Unique Non-Woven Process Rolls	Sig. ALMQUIST, Eric	
[316] INNOVATION IN FREQUENCY CONVERTERS TO REDUCE DOWNTIME AND IMPROVE PRODUCTIVITY IN STEEL PLANT	Sig. BASU, Suvro	
[320] Green steel production through the Endless Bar Production process	Sig. TERCELLI, Cristiano	
[333] The Pathway to Autonomous Ironmaking	BETTINGER, Dieter	
[369] Improvement on energy efficiency systems under volatile production scenarios	OSWALD, Jonas	
[380] Multi-alloy production via chips compaction and hot rolling	Sig. CETTO, Pietro	
[392] AI-BASED SURFACE INSPECTION AND 3D PROFILING FOR QUALITY ASSURANCE IN STEEL PRODUCT GRINDING	Sig. SHARP, Richard	
[404] Green Hydrogen in Cogne	MORREALE, Vincenzo	
[439] Effect of slag conditions on the wetting behavior between blast furnace slag and cokes	Sig. SHIN, Hyeonwoo	
[450] Decarbonization of Steel: Challenges and Opportunities for Modern Steelmakers and Carmakers	BUCCI, Stefano	

[137] Production conditions of porous iron whisker for the gas reforming in CRIP-D ironmaking process	SATO, Haruka	
[231] Optimization of Fe-Mn-Al-C low-density steels for forging application	Prof. CALLIARI, Irene	
[324] Investigation of the reoxidation behaviour of HBI samples produced on a laboratory scale	NESTEROV, Sergej	
[338] Determining of iron oxide pellet porosity using image analysis	Sig. BORGES MATOS, Eduardo	
[43] Advanced fluid flow simulation for the RH process	Sig. ODENTHAL, Hans-Jürgen	
[225] Local Area Production System	THIEL, Jan	
[425] AI-Based Optimization of Compressed Air Networks in Hard-to-Abate Industrial Sectors	ORLIETTI, Lorenzo	
[9] Different Options of Stove Modernization using Innovative Top Combustion Stove of Kalugin Design	Sig.na KALUGINA, Marina	
[173] Green Manganese steel from remelting of hydrogen based Direct Reduced Iron (DRI) and green Ferroalloy: a CO2 free approach	KUMAR, Pankaj	
[185] Next generation of sustainable HICON/H2® bell-type furnace systems	SEEMANN, PETER	
[306] Thermal simulation of WAAM process to support production	FERNANDES, Mériane	
[342] Development of a 1D Numeric model for axial pebble bed Thermal Energy Storage (TES) as a design decision tool for waste heat recovery in steel plants	MOUSSALEM, antoine	
[417] Advancing Hydrogen Plasma Smelting Reduction: Process Simulation and technical and environmental assessment	HASSANPOUR, Hamideh	
[104] FUME TREATMENT PLANT FOR A STEELMAKING FACILITY: OVERVIEW OF THE MAIN FACTORS THAT AFFECT THE FINAL CHOICE	TOMBA, MATTEO	
[202] Smarter Galvanizing through Zinc Coating Optimization with EMG iCASS®: A Modular AI-Driven Platform	KRESO, Mark	
[280] Mitigating Worker Skills Gaps using Digital Workflows & Mixed Reality	Sig. ALMQUIST, Eric	
[303] Safer Electric Melting: How robotics is transforming the EAF steel production	RUSU, ION	
[393] PREVENT BOTTLENECKS AND OPTIMIZE LADLE AND CRANE LOGISTICS FOR AN EAF-BOF MELT SHOP	UHL-HÄDICKE, Paul	
[457] FROM DATA TO DECISION: UNIFYING PRODUCTION MANAGEMENT AND TPQC FOR OPTIMIZED STEEL PRODUCTION	Sig. HERZOG, Kurt	
[101] PERT BS STAND APPLICATION IN A UPGRADE OF SECTION MILL – CASE HISTORY-	Sig. TOMBA, NICOLA	
[71] Advancements in Genius CM® Chatter: Enhancing Chatter root cause detection and vibration management at BRS PLTCM	RICHARD, Sebastian	
[57] Improvement of Breakout Prevention for startup stability enhancement in high productivity thin slab casters	Dr. PURSCHE, Thomas	
[477] Experiences and lessons learned from Metso's Outotec pilot DRI smelting tests	HAIMI, Timo	
[479] Novel production route of fully processed high-Si NGO steels for e-mobility at Marcegaglia Ravenna plant	Dr. BARBERINI, Francesco	
[314] Effects on steel oxidation kinetics and oxide scale features of hydrogen combustion	CIRILLI, F	
[119] DynReAct – An open-source production planning software	NÖLLE, Christoph	

[388] Demonstration of XR experience via Hands-On Session	BORASIO, Emanuele	

Get-together - Meet&Greet (19:00 - 20:30)

mercoledì 8 ottobre 2025

Alloy Design & Microstructure Control - Mozart (09:00 - 10:40)

4.1.1

-Coordinatori: Ettore Anelli

time	[id] title	presenter
09:00	[30] Boron alloyed free cutting steel: a new candidate for Pb steel substitution	UNIFANTOWICZ, Paulina
09:20	[242] Effect of carbon content (0.61 to 0.99 wt.%) on bainite transformation kinetics, structure and tempering resistance in low alloy steel	STÅHLKRANTZ, Adam
09:40	[407] Microstructural optimization and mechanical behavior of SS-QP treated 30CrNiMo8 steel	BELFI, Marco
10:00	[175] Role of Vanadium in welding of flat products in High-Strength Low-Alloy Steel: microstructure and mechanical properties	DI SCHINO, Andrea
10:20	[442] Designing thermomechanical processing schedules for Mo- and Cu-containing quenching and partitioning medium-Mn steels for multiphase forgings	Sig. SKOWRONEK, Adam

Blast Furnace Process Optimization & Control - Vivaldi (09:00 - 10:20)

1.3.1

-Coordinatori: Davide Mombelli

time	[id] title	presenter
09:00	[353] Solid as Iron: Integrated Blast Furnace Control, Optimization, Condition Monitoring, and Simulation	BETTINGER, Dieter
09:20	[429] A blast furnace tapping simulator to better understand dead man flotation scenarios	Sig. PUCHER, Samuel
09:40	[424] Burden distribution modeling to diagnose blast furnace operations	GE, Sa
10:00	[256] Industrial Implementation of PyroLIBS for Continuous Hot Metal Chemistry Measurement	SHAHRIARI, Bijan

Cooling & Solidification Control - Salieri (09:00 - 10:40)

2.3.3

-Coordinatori: Marco Alloni

time	[id] title	presenter
09:00	[117] Hybrid solution for local heat transfer coefficients in a transient solidification model for continuous casting	Sig.na SEIDL, Monika
09:20	[427] Simulation of transient temperature and solidification evolution in a continuously cast slab using multiple transverse sections	IVANOVA, Anna
09:40	[23] Bending Control With Cooling Bed Technology for Typical Alloy Cold Heading Steel Billet.	CHEN, Zhiping
10:00	[114] Finite Element Thermo-Mechanical Modeling of Continuous Casting: Simultaneous In-Mould Solidification and Mould Condition Analysis for High-Speed Billet Casting with Danieli's Power Mould™	GOTTI, Arianna

10:20	[160] Secondary Cooling Heat Transfer Measurements on a New Test Rig	JAVUREK, Mirko

Energy Efficiency & Decarbonization - Auditorium Verdi (09:00 - 10:40)

2.2.4

-Coordinatori: Mauro Bianchi Ferri

time	[id] title	presenter
09:00	[434] Influence of Hydrogen-DRI on the EAF process	HEINL, Leon
09:20	[252] Effects of H2 as energy source and biocarbon injection in EAF	Sig. ORRE, Joel
09:40	[38] Experimental evaluation of a flexible natural gas and hydrogen burner in the electric arc furnace	SCHULTE, Lilly
10:00	[257] Efficiency of bio-carbon as slag reduction and slag foaming agent in EAF	SANDBERG, Erik
10:20	[385] Simulating the use of renewable and alternative Carbon-bearing materials and hydrogen in the Electric Arc Furnace through a flowsheet model	Prof. COLLA, Valentina

Energy Efficiency & Recovery - Respighi (09:00 - 10:40)

5.3.4

-Coordinatori: Matteo Marten-Perolino

time	[id] title	presenter
09:00	[74] Energy recovery in long product casting	Dr. HAUENSTEIN, Gian
09:20	[99] Optimizing Energy Media Consumption and Reducing Greenhouse Gas Emissions in Coil Coating Lines	Sig. CHIAPPA, Michele
09:40	[132] Volteron - Technology for Green Steel	Sig. MICHEL, David
10:00	[200] Optimized Control of an EAF off-gas system by Video Analysis	STEINPARZER, Thomas
10:20	[248] Optimizing Process Gas Utilization through AI: A Sustainable Energy Solution	Dr. YU, Han

Hydrogen-Based Steelmaking Technologies - Margherita I (09:00 - 10:00)

5.2.1

-Coordinatori: Ismael Matino

time	[id] title	presenter
09:00	[386] Innovative Approaches To Sustainable FeCr Production Through Biocarbon and H2 Utilization	MOUSA, Elsayed
09:20	[174] Challenges and solutions for process characterisation of hydrogen plasma smelting reduction (HPSR) at pilot scale and beyond.	QUICK, Cameron
09:40	[51] SMS ZERO2Flame HY2 burner for reheating furnaces	Sig. ZANUSSO, Umberto

Rolling Mill Technology & Process Optimization - Margherita II (09:00 - 10:00)

3.1.1

-Coordinatori: Caiyi Liu

time	[id] title	presenter
09:00	[330] Innovative Rolling Mill for Seamless Structural Hollow Sections - The legacy of MSH profiles continues	SURMUND, Jörg
09:20	[373] Low-emission, multiline, quality bar quenching and tempering lines: Danieli Olivotto Ferré multiline solution maximizes production capacity and final product quality	BARBERIS, Andrea
09:40	[436] A New Technology for Bar and Wire Rod Mills	SHORE, Stephen (Mark)

Blast Furnace Decarbonization - Margherita I (10:00 - 10:40)

5.2.2

-Coordinatori: Ismael Matino

time	[id] title	presenter
10:00	[323] Hydrogen Pulse Injection into the Blast Furnace Shaft	BARTUSCH, Hauke
10:20	[226] Beyond Carbon Neutral with Ultra-low Coke-rate Blast Furnace	SEKIGUCHI, Takeshi

Coffee break (10:40 - 11:10)

Alloy Design & Microstructure Control - Mozart (11:10 - 11:50)

4.1.1

-Coordinatori: LUIGI CHINAGLIA

time	[id] title	presenter
11:10	[106] Predicting recrystallization phenomena with DIGIMU□ during hot-rolling of grade AISI 304L	SOURISSEAU, Thomas
11:30	[274] Effect of short-time annealing on recrystallization and texture evolution in an electrical steel	Dr. CAROSI, Daniele

Blast Furnace Decarbonization - Margherita I (11:10 - 12:50)

5.2.2

-Coordinatori: Gert Nilson

time	[id] title	presenter
11:10	[249] The SMART project : recycling of plastics and waste materials in TORERO to substitute more coal injection in the blast furnace	GAROT, Damien
11:30	[308] 150 tons revert-based briquettes produced and processed in a blast furnace	DEN HOLLANDER, Joyce
11:50	[326] Blast Furnace CO2 Emissions: A Techno-Economic Assessment	VAN LAAR, Reinoud
12:10	[364] Blast Furnaces CO2 mitigation: Ekofor technology (E.S.C.H. gmbh) for BLUAIR injection (Secondary Raw Material - recycled polymers)	GOSPARINI, Elia
12:30	[476] Decarbonization by Process Optimization - Off-Gas Results Using Deep View Infra-Red Technology	GRAF, Alexandra

Burden Materials & Quality - Vivaldi (11:10 - 12:30)

1.3.2

-Coordinatori: Davide Mombelli

time	[id] title	presenter
11:10	[345] Sodium silicate impacts on blast furnace operation.	Sig. PEREIRA DE SÁ, AUGUSTO
11:30	[241] Comparison of laboratory tests and HKM blast furnaces on the reduction and carburisation behaviour of burden materials under coke gas injection	Dr. PERRET, Fabian
12:10	[199] Influence of the mineral gangue on pellets softening melting properties in Blast Furnace. Experimental study of phase equilibria during the melting of pre-reduced pellets	GRAZ, Yann

Caster Design & Process Optimization - Salieri (11:10 - 12:50)

2.3.4

-Coordinatori: Marco Alloni

time	[id] title	presenter
11:10	[236] Development of optimized continuous casting process for zero-defect round blooms production in high silicon 54SiCr6 automotive spring steel. Production trials in Acciaierie Bertoli Safau S.p.A.	BUSOLINI, Sara
11:30	[221] Development of an Optimized Strand-EMS for Improved Microstructure and Reduced Segregation in Continuous Casting	LEE, Soonho
11:50	[228] Improved Internal Quality of High-Grade Steel Plate Using PosHARP Technology	Sig. CHO, You Beom
12:10	[77] The new MSR bloom caster at Saarloha Advance Materials, Pune	ABRAM, Marco
12:30	[466] Machine learning model for mould powder consumption in continuous steel casting	DA SILVA CRUZ, Pedro Paulo

Energy Efficiency & Decarbonization - Auditorium Verdi (11:10 - 11:30)

2.2.4

-Coordinatori: Klaus Krüger

time	[id] title	presenter
11:10	[448] Pneumatic injection of carbon neutral sources in the EAF melting process: a comprehensive overview of the use of new materials	MARCUZZI, Simone

Energy Efficiency & Recovery - Respighi (11:10 - 12:10)

5.3.4

-Coordinatori: Matteo Marten-Perolino

time	[id] title	presenter
11:10	[296] REUSE OF RECOVERY THERMAL ENERGY FOR WATER TREATMENT IN STEEL INDUSTRY	Sig. FERRANTI, Angelo
11:30	[403] EAF Waste Heat Recovery: Turning Industrial Waste into Sustainable Energy	MORREALE, Vincenzo
11:50	[460] Waste Heat Recovery systems for EAF primary fumes	Sig. FERUGLIO, Alberto

Roll Technology & Maintenance - **Margherita II (11:10 - 12:50)**

3.1.2

-Coordinatori: Silvia Barella

time	[id] title	presenter
11:10	[61] Wear and oxidation behavior of cast high-speed steels used for work rolls in hot rolling mills	REITER, Maximilian
11:30	[100] PERT GRINDING BALL ROLLING MILL	Sig. TOMBA, NICOLA
11:50	[72] Sustainable repairs of machine parts in rolling mills by advanced coating technologies	Sig. MIRZ, Markus
12:10	[172] Advanced manufacturing and improved performances of hot rolling mill edger rolls (EdgerRolls)	Sig. MALBRANCKE, Jurgen
12:30	[15] On The Performance of Implementing Pre-conditioned Oxide Film of HSS Rolls in A Hot Strip Mill	ZHANG, ZHI

Slag Optimization & Process Control - **Auditorium Verdi (11:30 - 12:50)**

2.2.5

-Coordinatori: Klaus Krüger

time	[id] title	presenter
11:30	[397] Physicochemical properties of electric steelmaking slags for the mitigation of CO2 emissions: Active use of HBI with various intrinsic carbon	PARK, JOO HYUN
11:50	[237] Electrical conductivity modelling of molten slag based on viscosity data - A mechanistic approach	Sig.na SCHLEMMER, Nina
12:10	[420] A Sustainable EAF Slag Practice Based on HYBRIT Laboratory Studies	Dr. MARTINSSON, Johan
12:30	[246] Fast process slag analysis with laser spectroscopy, opening new opportunities for active optimization during melting and refining process.	AHSAN, amit

Special Applications & Performance - **Mozart (11:50 - 12:50)**

4.1.2

-Coordinatori: LUIGI CHINAGLIA

time	[id] title	presenter
11:50	[467] Laser Cutting of Key Metals in the Construction Industry	KANYILMAZ, Alper
12:10	[344] Performance of a HSLA steel produced via EAF and ESP® process route for the service in gaseous hydrogen	ZANABONI, Lorenzo
12:30	[188] Hydrogen Embrittlement in Pipeline and Cast Steels for Gas Transport Infrastructure	Dr. JIRKOVA, Hana

Water Management & Treatment - **Respighi (12:10 - 12:50)**

5.3.5

-Coordinatori: Matteo Marten-Perolino

time	[id] title	presenter

12:10	[178] Dry granulation process and technology for LF slag treatment	CHIARULLO, Enzo Josef Sig.na OLIVERIO, Simona
12:30	[103] ZERO IMPACT FOR WATER RESOURCES FOR A STEEL INDUSTRY COMPLEX	TOMBA, MATTEO

Lunch (12:50 - 14:00)

Advanced High-Strength Steels (AHSS) & High-Strength Steels (HSS) Development - **Mozart (14:00 - 15:20)**

4.1.3

-Coordinatori: Andrea Di Schino

time	[id] title	presenter
14:00	[449] Advances in Steels for Stronger Body-in-White and Enhanced Safety	DEARDO, Anthony
14:20	[121] On the influence of EAF based steelmaking on AHSS	BERNHARDT, Jonny
14:40	[164] Development of High-Strength Dual Phase (DP) Steels with Enhanced Ductility	Dr. OH, SEONGTAK
15:00	[22] Continuous Annealing and Galvanizing Line electrification: decarbonation as a new opportunity to produce HSS and AHSS by flash annealing	Dr. BARBIER, David

Automation & Digitalization - **Margherita II (14:00 - 15:40)**

3.1.3

-Coordinatori: alessandro ferraiuolo

time	[id] title	presenter
14:00	[166] SMART Grease selection for Roller Bearings of Continuous Casters and Rolling Mills to reduce maintenance cost and extend bearing life.	Sig. MATTERN, Tim-Oliver
14:20	[370] Relaxation and creep in hot coiled steel strip	LINDWALL, Johan
14:40	[295] Finite Element modelling of skid marks on steel slabs in a walking beam reheating furnace	Dr. LINDWALL, Johan
15:00	[46] Construction of heat treatment analysis model considering transformation plasticity and accuracy verification	FUJISAWA, Takuya
15:20	[408] Unbeatable product properties and performance of Danieli's K-Spooler	Dr. CIMOLINO, Maicol

Caster Design & Process Optimization - **Salieri (14:00 - 16:00)**

2.3.4

-Coordinatori: Silvia Barella

time	[id] title	presenter
14:00	[151] CFD and FEM study on redesigning the mould geometry of the thin slab caster of Tata Steel in IJmuiden for enhanced casting performance	Dr. SENGE, Stefan
14:20	[213] Enhancing the Quality of Continuously Cast Products: Optimized Caster Design and Process Tuning for High-Quality Blooms	Sig. BAF, Stefano
14:40	[351] A LOOK AT DANIELI DCM'S STRATEGIC PLANT UPGRADES ACROSS ITALY	Sig. TRISCIUZZI, Achille

15:00	[294] Bow-Type Continuous Casting: A New Era in Ultra-Thick Slab and Heavy Plate Manufacturing	Dr. BAUMGARTNER, Kerstin
15:20	[55] Conseal for slabs: Patented solution for optimizing start of cast	Sig. DRÜEN, Alexander
15:40	[76] High Speed Billet Casting: Introduction of a new Billet CCM at Tosyalı Demir Çelik	MARCUZZI, Roberto

Direct Reduction & Alternative Ironmaking - **Margherita I (14:00 - 16:00)**

5.2.3

-Coordinatori: Marten Sprecher

time	[id] title	presenter
14:00	[92] The impact of DRI ratio and quality on EAF operational and metallurgical performances	Sig. BROSSE, Guillaume
14:20	[267] Techno-Economic Assessment of H□-DRI and NG-DRI-CCS Processes for Low-Emission Iron Production	Sig.na GUAZZI, Sara
14:40	[363] Flexible pathways for green iron production	Sig. ENGEL, Edo
15:00	[468] Design of a sustainable iron ore smelting system using biochar-based direct reduction and CO□ sequestration to lower steel's carbon footprint in Marcegaglia site at Ravenna port	Prof. MAPELLI, Carlo Dr. DALL'OSTO, Gianluca
15:20	[163] Simulation-driven comparison and investment prioritization of gas-fired and electric radiant tubes in galvanizing furnaces.	Sig. BERTOLI, Marco
15:40	[383] Replacement of Conventional Gas Burners with Electrical Resistive Heating for Tundish processes: A Sustainable Approach within the CITADEL Project	ROSÉN, Rebecca

Hydrogen-Based Reduction - **Vivaldi (14:00 - 16:00)**

1.4.3

time	[id] title	presenter
14:00	[169] Important aspects to optimise hydrogen enrichment in direct reduction	Dr. HAUCK, Thorsten
14:20	[144] Experimental and model-based investigations on the influence of iron ore properties on hydrogen-based direct reduction kinetics.	GALLWITZ, Michael
14:40	[204] The Role of Pre-Oxidation Degree, Particle Size, and Ore Composition in Optimizing Hydrogen-Based Reduction Efficiency of Magnetite Ores	GARG, Pritesh
15:00	[349] HYBRIT PILOT PROJECT: NEW SPONGE IRON PRODUCT WITH UNIQUE PROPERTIES	RIESBECK, Johan
15:20	[438] Study of the reduction of a hematite pellet by CO-H2 mixture gas	KANG, youngjo
15:40	[136] Hydrogen direct reduction of iron ores: effect of agglomeration	Prof. CAVALIERE, Pasquale

Slag Optimization & Process Control - **Auditorium Verdi (14:00 - 15:20)**

2.2.5

time	[id] title	presenter

14:00	[328] On the benefits of switching from lime to dololime fines injection in electric arc furnace	Prof. MOMBELLI, Davide
14:20	[426] New techniques for improvement of the monitoring and conditioning of slag in EAF steelmaking for the optimization of steel treatment and slag recovery	FRITTELLA, Piero
14:40	[391] Slag changes in future steelmaking scenarios: simulation investigations	Dr. MATINO, Ismael
15:00	[433] Slag foaming due to CO generated at the slag/metal interface	CONEJO, Alberto

Water Management & Treatment - **Respighi (14:00 - 15:00)**

5.3.5

-Coordinatori: Valentina Colla

time	[id] title	presenter
14:00	[307] FerSol, the new three-in-one water treatment chemical	Sig. KLUT, Peter
14:20	[440] Smart Automation for Efficient Water Management in Steelmaking: The Q-WATER System	Sig. FORNASIER, Marcellino
14:40	[239] Ensured fresh water supply by waste and process water treatment	HUBRICH, Martin

AI & Machine Learning Applications - **Respighi (15:00 - 16:00)**

6.1.1

-Coordinatori: Valentina Colla

time	[id] title	presenter
15:00	[350] From Data to benefit - application of AI technologies in steel production	HERZOG, Kurt
15:20	[45] Predictive-Prescriptive Quality Control in the Steel Industry: A Synergy of Human Knowledge, Machine Learning and Auto-mation Framework	Dr. STENICO, Alessandro
15:40	[120] Exploring capabilities of an auction-based multiagent system in real-time reactive scheduling	GUTIERREZ, Miguel

Digitalization, AI & Process Modeling - **Auditorium Verdi (15:20 - 16:00)**

2.2.6

time	[id] title	presenter
15:20	[189] Application of Federated Learning to enhance model-based Decision Support for EAF online Monitoring and Control at multiple plants	KLEIMT, Bernd
15:40	[486] Innovative Method for Scanning an Electric Arc Furnace and Digital Twin-Based Simulation of the Tapping Process	PLIETH, Adrian

Forging - **Mozart (15:20 - 16:00)**

3.2.1

-Coordinatori: Andrea Di Schino

time	[id] title	presenter
15:20	[394] OEE improvement of TBB Forging mill	Sig. ESQUISITO, Nicholas

15:40	[362] ENERGY SAVING ON A 70 MN OPEN DIE FORGING PRESS	Sig. BALDASSI, Mauro

Coffee break (16:00 - 16:30)

AI & Machine Learning Applications - Respighi (16:30 - 17:30)

6.1.1

-Coordinatori: Christine Gruber

time	[id] title	presenter
16:30	[59] AI-Powered Classification and Prediction of Process Defaults in Steel Manufacturing	Dr. GAIA, Luca
16:50	[218] Performance of AI Oriented Contrastive Learning vs Convolutional Neural Networks (CNNs) in Quality Assessment of Zinc Coating Steel Coils	GUTIERREZ, Miguel
17:10	[395] AI-Powered IT Infrastructure for Enhanced Safety in EAF Operations	Prof. COLLA, Valentina

Alternative Fuels & Decarbonization - Vivaldi (16:30 - 17:30)

1.3.3

time	[id] title	presenter
16:30	[93] Ecologic and Economic Evaluation of COG Injection and Comparison with other Fuel Gas Injection Systems	Dr. HAAG, Michel
16:50	[410] Pathways for Sustainable Hot Metal Production from DRI to Support Green Steel Production	GE, Sa
17:10	[331] Dry Blast Furnace Gas Cleaning: Technology and Operational Experiences	Sig. KLUT, Peter

Digitalization, AI & Modeling - Salieri (16:30 - 18:30)

2.3.5

-Coordinatori: Gianluca Dall'Osto

time	[id] title	presenter
16:30	[310] Flow and solidification modeling in continuous casting of steel: an European expertise mapping at a glance and positioning at a global level	DE SANTIS, Michele
16:50	[141] A comparative CFD study on tundish flow with particle tracking	BRUNIER, Philippe
17:10	[374] CC Process optimization through combined digital twin and in-line measurement technology for a stainless-steel slab production	Dr. BANASZAK, Marc
17:30	[412] ADVANCING CONTINUOUS CAST SEMI-PRODUCT QUALITY THROUGH A DIGITAL TWIN FRAMEWORK	KAUKONEN, Saku
17:50	[418] An OpenFOAM Eulerian-Lagrangian Model of a Polydisperse Bubbly Flow in a Continuous Casting Mould	AMIRZADEH, Saeid
18:10	[253] Inline intermix detection by laser spectroscopy, increasing the metallurgical output in continuous casting strand.	SPRUNK, Martin

Digitalization, AI & Process Modeling - Auditorium Verdi (16:30 - 18:10)

2.2.6

-Coordinatori: Cosmo Di Cecca

time	[id] title	presenter
16:30	[491] Enhancing Integration in the Metals Industry: A Convergence Strategy to Software Architecture	Sig. MAIA, Thiago
16:50	[415] Continuous improvement on process modelling in EAF steelmaking as support to process prediction and management	FRITTELLA, Piero
17:10	[447] SmartKnB: Artificial Intelligence tools for EAF Optimization	PLACIER, Emmanuel
17:30	[423] CALPHAD-based Thermodynamic and Kinetic Simulation of Secondary Steelmaking with Focus on Inclusion Formation and Modification	Dr. GRUNDY, Anthony Nicholas
17:50	[488] Estimating the amount of Hot Heel in an EAF: a novel, robust approach.	VAN INGELGEM, Yves

Direct Reduction & Alternative Ironmaking - Margherita I (16:30 - 17:30)

5.2.3

-Coordinatori: Davide Mombelli

time	[id] title	presenter
16:30	[343] Advancements in Electrification and Decarbonization Technologies for High-Temperature Process Heating in Steel Manufacturing: The Role of Coolbrook's Rotodynamic Technology	Dr. PAANANEN, Timo MAAKALA, Viljami
16:50	[230] Alternative Annealing Process for NGO Electrical Steels Using Hydrogen Combustion: A Comparative Study	MASSARELLI, Niccolo
17:10	[259] Bio-char production and usage for iron ore pelletization	CROCCO, Beatrice

Forging - Mozart (16:30 - 18:30)

3.2.1

-Coordinatori: Gerhard Hackl

time	[id] title	presenter
16:30	[149] Effect of Intermediate Intercritical Quenching on Low Temperature Toughness of Low-alloy Steel Forgings	Dr. ANELLI, Ettore
16:50	[48] Advanced Ring Rolling Simulations with Embedded Machine Control Systems	Dr. VAN PUTTEN, Koos
17:10	[270] Optimization of Process Control and Energy Consumption in Hot Flat Ring Rolling Using Interactive Real-Time Software	Sig. MUNARI, Marco
17:30	[263] A combined experimental–numerical approach to assess the effects of quenching transfer time on the microstructure and mechanical properties of a Ti-6Al-4V alloy	Dr. MAGHINI, Davide

Quality Control & Inspection - Margherita II (16:30 - 18:30)

3.1.4

-Coordinatori: Alessandra Saleri

time	[id] title	presenter

16:30	[102] Online and Real-Time Recrystallized Fraction Estimation in Steel Rolling Processes by Laser Ultrasound	MALMSTRÖM, Mikael
16:50	[41] Study on shape defects of thin steel sheets caused by steep longitudinal temperature gradient	YOSHIMOTO, SOSHI
17:10	[483] Vision Technology-Based Surface Quality Optimization for Continuous Hot-Dip Galvanizing Process	PARK, TAE JUN
17:30	[145] New insights from the online LUS grain size measurements	Dr. HOPPE, Dietmar
17:50	[304] Advanced robotic system for automated plate processing: precision, efficiency, and seamless integration	RUSU, ION
18:10	[123] In-Situ Grain Size Measurement During Hot Rolling Simulations With Dynamic Recrystallization By Laser Ultrasonics	MALMSTRÖM, Mikael

Process Optimization & Control - Respighi (17:30 - 18:10)

6.1.2

-Coordinatori: Christine Gruber

time	[id] title	presenter
17:30	[138] Enabling Batch Process Flexibility Through Electricity Market Interfaces in Steel Production	BÖCKER, Benjamin
17:50	[52] Seamless Quality Management in the Transition to Energy-Efficient Steel Production	Sig. CLAFF, Thorsten

Refractory & Equipment Maintenance - Vivaldi (17:30 - 18:30)

1.3.4

time	[id] title	presenter
17:30	[183] Investigations on hearth refractory and skull	KIM, Jungil
17:50	[453] Blast Furnace Hearth Relines From Concept to Construction	Sig. TOLKAMP, Rudy
18:10	[206] Development of a Handheld Low-Frequency Ultrasonic System for Precise Stave Wear Measurement in Blast Furnaces	SADRI, Afshin

Conference dinner - Winter Garden (19:00 - 23:00)

giovedì 9 ottobre 2025

Automation & Process Control - Salieri (08:30 - 10:10)

2.3.6

-Coordinatori: Michele De Santis

time	[id] title	presenter
08:30	[217] Electromechanical servo drive for mold level control: performance and evolution	BAF, Stefano
08:50	[223] Advanced Instrumentation and Holistic Process Improvement in Continuous Casting at Outokumpu Tornio	LANG, Oliver
09:10	[300] Human-free casting operation. Safety and efficiency increase thanks to robotization and artificial vision	GELMINI, Mario
09:30	[170] Improved EMLI Technology for Early Slag Detection and Enhanced Steel Yield and Quality	Sig. MITRA, Chayan
09:50	[176] Safe Tundish Drain with Residual Steel Detection (RSD) for Maximized Yield and Process Optimization	RUF, Benjamin

Digital transformation - Steel materials and their application - Mozart (08:30 - 10:10)

6.1.5

-Coordinatori: Cristian Viscardi

time	[id] title	presenter
08:30	[334] Transparent Online Calculation of Product Carbon Footprint in Steel Industry	Dr. SCHLAUTMANN, Martin
08:50	[278] Multi-agent-based approach for decreasing carbon footprint of future integrated steelworks: the AgiFlex overall concept	Dr. MATINO, Ismael
09:10	[118] Fast and robust order-based scheduling to solve the Mid-Term planning problem	BRANDENBURGER, Jens
09:30	[58] Optical Measurement of raw material particle size	Dr. DENGLER, Christian
09:50	[127] Optimized availability of a mechanical drive system through holistic predictive maintenance approach	Sig. ÄIKÄS, Veikko

Ironmaking Cokemaking - Vivaldi (08:30 - 10:10)

1.1.1

time	[id] title	presenter
08:30	[89] Innovative Decarbonization Strategies: Thermal dry reforming for enhanced blast furnace efficiency	CASTAGNOLA, Cristiano
08:50	[108] Impact of iron source and binder type on the mechanical strength and microtexture of ferro-coke	LU, Guanghua
09:10	[180] Control of Low Bulk Density Region around Briquette in Briquette Blending Carbonization Process	Sig. TAKAHASHI, Isao
09:30	[233] Adapting to age: Upgrading Coke Oven Machines for sustainable plant longevity	Sig. KORKMAZ, Gabriel

09:50	[130] Influence of HDPE addition on microstructure transformation during coking of Australian coking coals	Sig. JO, Jangho

Process Monitoring & Quality Control - **Auditorium Verdi (08:30 - 09:30)**

2.2.7

-Coordinatori: Mauro Bianchi Ferri

time	[id] title	presenter
08:30	[437] Developments of monitoring of Billets quality through modelling and new sensors in the frame of Sunshine project	FRITTELLA, Piero
08:50	[430] Effect of Bottom-Blowing on Nitrogen Removal Kinetics in Electric Arc Furnace (EAF) Conditions	BYUN, GeunWoo
09:10	[336] Advanced EAF Optimization Strategies Using Intelligent Tenova Technologies	Sig. SCIPOLO, Vittorio

Process Optimization & Control - **Respighi (08:30 - 10:10)**

6.1.2

-Coordinatori: Luca Piedimonte

time	[id] title	presenter
08:30	[255] Energy-efficient production based on a comprehensive scheduling including an optimized temperature guidance and heat pacing	Dr. JANNASCH, Otmar
08:50	[265] A continuous flow model for long-term production scheduling and reactive replanning.	WOLFF, Andreas
09:10	[361] Case study on product quality management on a continuous galvanizing line thanks to digital solution	MONNOYER, Maxime
09:30	[347] The use of image data in steelmaking – a short guide to promises and pitfalls	GRUBER, Christine
09:50	[279] Global-Local Order Dressing: How Steel Producers Can Use Product Configuration and Rule-Based Engines to Generate Production Orders	Dr. STENICO, Alessandro

Quality Control & Inspection - **Margherita II (08:30 - 10:10)**

3.1.4

-Coordinatori: Giordano Streghi Montauti

time	[id] title	presenter
08:30	[288] A Study on reducing the dispersion of the mechanical properties of hot coils through the dynamic adjustment of the coiling temperature	LEE, SangYoung
08:50	[285] Advancing Online, Continuous Surface Cleanliness Monitoring with the TST.1 System	Sig. ALMQUIST, Eric
09:10	[399] Laser ultrasonics for microstructure verification of heat treatments and thermal processes (LUMHEAT)	WIKMARK KREUGER, Hampus
09:30	[358] New Optical Flatness Measurement by Magnetic Deflection	Sig. ROGGE, Marian
09:50	[305] Enhancing quality control for Long Products with robotics and computer vision	RUSU, ION

Waste Utilization & Carbon Capture and Utilization - **Margherita I (08:30 - 10:10)**

5.2.4

-Coordinatori: Georg Gaiser

time	[id] title	presenter
08:30	[19] FILTRABIT-NEW INNOVATION TO INDUSTRIAL DUST EXTRACTION	Sig. TOLONEN, Jyri Dr. FAGERLUND, Kim
08:50	[317] Modular hybrid technology in the steel plant production	GILI, Matteo
09:10	[65] Sustainable Carbon Solutions for CO2 Mitigation in the Metallurgical Industry	RIGAS, Konstantinos
09:30	[352] Integrating CO□ Reporting with Physically Consistent Material and Energy Flow Analysis to Improve Circularity of Steel Products	Dr. DIEKMANN, Uwe
09:50	[162] Green Steel Initiatives Supported by Enhanced Slag Engineering Using High-Alumina Circular Metallurgical Additives	KEK, Florian

Conversion and refining process - **Auditorium Verdi (09:30 - 10:10)**

2.1.3

-Coordinatori: Mauro Bianchi Ferri

time	[id] title	presenter
09:30	[262] Latest Startups and Technology Features for Stainless Steel Production via AOD in Europe	VORABERGER, Bernhard
09:50	[335] Zinc flexible RecoDust process	REITER, Wolfgang

coffee break (10:10 - 10:40)

Advanced Materials & Special Applications - **Margherita II (10:40 - 12:20)**

3.1.5

-Coordinatori: Andreas Kern

time	[id] title	presenter
10:40	[455] Enhancing rail performances: the Danieli RH2 - Rail Head Hardening process	Sig. PALMA, Andrea
11:00	[47] From Quantity to Quality: Evolving Wire Rod Production to Meet Modern Market Demands with SMS group	MAURIZO, David
11:20	[315] MetConZero: Metallurgical Consequences of Zero Carbon Steelmaking	Sig. JENNEN, Robrecht
11:40	[247] New, future ready production network for non grain oriented electrical steel	SCHONGEN, Fabian
12:00	[97] Green DUE: Fossil-free casting and rolling technology for high quality automotive exposed panels	Sig. CONTE, Riccardo

Automation & Process Control - **Salieri (10:40 - 12:00)**

2.3.6

-Coordinatori: Michele De Santis

time	[id] title	presenter
10:40	[301] A customizable robotic for maintaining the ladle sliding gate	GELMINI, Mario
11:00	[273] Fully automated antimixup solution with LIBS technology, ensuring 100% check of the bar and billet proven over years of process operation.	AHSAN, amit
11:20	[360] Ultrasonic steel level control: focus on performances and operability based on case study	CICUTTO, Simone
11:40	[75] On the application of FEMS and MSR technologies on the continuous casting of long products	ABRAM, Marco

Conversion and refining process - **Auditorium Verdi (10:40 - 11:20)**

2.1.3

time	[id] title	presenter
10:40	[325] Online Temperature and Deformation Measurement for Vessel Shell of Oxygen Steelmaking Converters	SZAMBURZKI, Piotr
11:00	[245] Problem solving with modeling support: evaluation with a numerical fluid dynamic model of the different configurations of the slag-cutting deflector for oxygen jet lance tips in the BOF	Sig. DELL'UOMO, Alessandro

Digital transformation - Steel materials and their application - **Mozart (10:40 - 12:20)**

6.1.5

time	[id] title	presenter
10:40	[339] HyMAS: A Hybrid Multi-Agent Framework for Autonomous Steel Production Planning	IVANOV, Anton
11:00	[332] Artificial Intelligence-based decision support system for optimizing the ladle furnace process in the ALCHIMIA project	DETTORI, Stefano
11:20	[286] Exploring the Potential of Machine Vision (MV) and Artificial Intelligence (AI) in Steel Production	Sig. ALMQUIST, Eric
11:40	[462] Transforming Steelmaking: Advanced Automation Solutions Powering the Twin Transition	RADNER, Stefan
12:00	[291] Technology Consulting Meets Operational Excellence to Improve Steelplants Operations	Dr. BORRMANN, Lukas

Ironmaking Sintering & Pelletizing - **Vivaldi (10:40 - 12:00)**

1.2.1

time	[id] title	presenter
10:40	[235] Practical Sintering Guidance System: Integrating Data-Driven and Transient Models	YASUHARA, Satoki
11:00	[140] TRANSinter – Sintering process role in the (partial) transition to the Direct Reduction Route	FOUARGE, Hubert
11:20	[487] Advancing towards a competitive and sustainable steel's life cycle: the role of advanced process control in sustainable iron ore processing	Dr. WEI, Wenjing

11:40	[269] Cold Agglomerated Iron Ore Pellets Industrial Trial – High quality manufacturing and their performance in the Blast Furnace	WARREN, Peter

Process Optimization & Control - **Respighi (10:40 - 11:00)**

6.1.2

-Coordinatori: Luca Piedimonte

time	[id] title	presenter
10:40	[251] Towards zero-defect manufacturing for flat steel production - Introduction of the SurfConInspect Project	BRANDENBURGER, Jens

Waste Utilization & Carbon Capture and Utilization - **Margherita I (10:40 - 11:00)**

5.2.4

-Coordinatori: Andrea Grasselli

time	[id] title	presenter
10:40	[489] Reduction of CO□e Emissions in Steelmaking by Material and Process Innovations using Secondary Raw Materials from Recycled Waste Streams	VON GOELDEL, Stephan

Predictive Maintenance & Equipment Optimization - **Respighi (11:00 - 12:20)**

6.1.3

-Coordinatori: Luca Piedimonte

time	[id] title	presenter
11:00	[190] Automation on thermal control of blast furnace	MASUDA, Ryosuke
11:20	[371] DIGITAL TRASFORMATION IN REHEATING AND HEAT TREATMENT FURNACES: SHP	ZUNINO, Simone
11:40	[126] Advantages of manufacturer expertise and machine self-learning for effective predictive maintenance of industrial gearboxes	SCARMI, Alberto
12:00	[318] Harnessing Data Lakes for Global Maintenance Service: Insights and Improvements through Advanced Data Analysis	WEINZINGER, Michael

Process Transformation & Strategy - **Margherita I (11:00 - 12:20)**

5.2.5

-Coordinatori: Andrea Grasselli

time	[id] title	presenter
11:00	[220] Logistics Simulation for the Green Steel Transition: Optimizing Production and Sustainability	MÜHLBÖCK, Stefan
11:20	[281] Development of Oxygen-fuel Burner Design for Electric Arc Furnaces under Supersonic Flow Conditions	KIM, KYUNTAE
11:40	[20] Secondary metallurgy challenges in the transformation from oxygen to electric steelmaking	Sig. PEZZA, Andrea
12:00	[299] Towards Green Steel: Challenges, Opportunities, and Strategies for Decarbonization	Prof. BARELLA, Silvia

Control and modification of the non metallic inclusions - Auditorium Verdi (11:20 - 12:20)

2.1.2

time	[id] title	presenter
11:20	[39] Comparison of methods for modification of oxidic non-metallic inclusions using alkali elements on a laboratory scale	PREISSER, Nikolaus
11:40	[289] Evolution Behavior of Non-Metallic Inclusions in Al-killed Ti-bearing Ferritic Stainless Steel	Sig. JUNG, DONGYUL
12:00	[80] Evolution of non-metallic inclusions in non-oriented electrical steel: Industrial observations and laboratory test results	SAMMER, Bernhard

lunch (12:20 - 13:20)

Additive Manufacturing - Mozart (13:20 - 14:40)

4.2.1

-Coordinatori: Davide Maghini

time	[id] title	presenter
13:20	[368] Thermophysical property measurement of selected Nickel based superalloys by voestalpine BÖHLER Edelstahl GmbH & Co KG using a gas-tight Furnace Rheometer System and an Electromagnetic Levitation Apparatus	Dr. LEITNER, Thomas
13:40	[179] Development and Additive Manufacturing of MoNiCr Nickel Alloy for Energy Industry Applications	Dr. NACHAZELOVA, Daniela
14:00	[401] Applicability of a Ni-9%P+(a:C-H)DLC multilayer coating to improve the tribological behaviour of AISI 316L screws with internal channels produced by Powder Bed Fusion-Laser Beam	Dr. DI EGIDIO, Gianluca
14:20	[196] Advanced Materials and Additive Manufacturing for Demanding Industrial Applications: Nickel-Based Alloys for High-Performance Forging Tools	Dr. KOUKOLÍKOVÁ, Martina

Advanced Materials & Special Applications - Margherita II (13:20 - 15:20)

3.1.5

-Coordinatori: Andreas Kern

time	[id] title	presenter
13:20	[456] Upgrade a heavy section mill to produce high-strength beams with Danieli Thermo-Mechanical Control Process (TMCP)	Sig. GORI, Luca
13:40	[414] Advanced Long Rolling Solutions for Efficient Stainless-Steel Production	Sig. SHORE, Stephen (Mark)
14:00	[319] High End Steel Grade Production with Advanced Cooling Technologies - possibilities for AHSS	Sig. VIERNSTEIN, Bernhard
14:20	[441] Cutting-Edge Technologies To Produce Electrical Steel	Sig. MOUKARZEL, Camille
14:40	[69] Superior product change control at cold rolling mills for enhanced productivity	SIEGHART, Jörn
15:00	[87] Heavy plate applications ensure energy transition – Modern plant concepts for forward looking plate production	GUMBINGER, Hartmut

Digital Transformation & Industry 4.0 - Respighi (13:20 - 15:00)

6.1.4

-Coordinatori: Alessandra Saleri

time	[id] title	presenter
13:20	[366] Development of Digital Tools at HYBRIT's Pilot Plant for H2 Direct Reduction	VON SCHENCK, Henrik
13:40	[90] PCIXpert: boosting efficiency and resources utilization	Sig.na ICIRIDDIR, Yasmine
14:00	[355] Digitalization of Material Properties Across the Entire Process Chain	Dr. DIEKMANN, Uwe
14:20	[238] Towards a Standardized Digital Product Pass for Green Steel: Developing Novel Framework with Real-Time CO□ Tracking and Secure Data Connectivity for ESPR Compliance	SAHINEL, Doruk
14:40	[264] DIGITAL MANUFACTURING FOR THE DEVELOPMENT OF NEW ROLLING MILL FOR BEAMS	VISCARDI, Cristian

Digital transformation - Steelmaking Continuos Casting - Salieri (13:20 - 15:00)

6.1.6

-Coordinatori: Cosmo Di Cecca

time	[id] title	presenter
13:20	[309] Crafted Scrap: Scrap Yard Automation and Advanced Sensors	RADNER, Stefan
13:40	[413] Metallurgical Quality Assessment Of Continuous Casting Combining AI, Sensor Information and Machine Vision	Sig.na BOERU, Elena-Briana
14:00	[131] Explainable AI for Property Prediction in Scrap-Based Steel Production: A Public Data Implementation	MILLNER, Gerfried
14:20	[254] THE PIVOT ROLE OF MODELLING IN PROBLEM-SOLVING ISSUES IN CONTINUOUS CASTING OF STEEL: A PROJECT CLUSTERING EXPERIENCE IN THE EUROPEAN PROGRAMMES FRAME	DE SANTIS, Michele
14:40	[378] Application of Deep Learning technique to improve the scrap quality	PETRUCCIANI, Alice

Primary process and preparation of the materials - Auditorium Verdi (13:20 - 15:00)

2.1.1

time	[id] title	presenter
13:20	[475] BOF Technology in the 21st century - Lives declared dead - or survival of the fittest!	Dr. KEMPKEN, Jens
13:40	[276] CAESAR HEU project - CirculArity Enhancements by low quality Scrap Analysis and Refinement	PIERRET, Jean-Christophe
14:00	[243] BOF operation with increased scrap rate for CO$_{2}$-reduction	Dr. LICHTE, Marten
14:20	[44] Utilizing BOF/EAF Energy Recovery for Vacuum Generation in RH and VTD Type Degassers	WHITEHEAD, Mark
14:40	[459] Additional scrap melting capacity with dual-flow post-combustion lance at ArcelorMittal Dunkerque	HUBER, Jean-Christophe

6.2 IPTA 2025

Event information	
Event name (and acronym)	14th International Conference on Image Processing, Theory, Tools and Applications, IPTA 2025
Type of event	Conference
Date	October 13-16, 2025
Location	Istanbul (Turkey)
Geographic coverage	Europe, Asia
Type of audience	Computer Vision experts and researchers from industry and academia, PhD students
Approximate size of audience	≈100 persons.
Short description	IPTA 2025 gathered international researchers, innovators, educators, and practitioners in image processing for attending extensive educational high-level materials, sharing their achievements, exchanging their experiences and discussing future orientations. The conference provides an excellent forum to meet and discuss various important issues on image processing and applications. Topics included but are not limited to: • Image formation, scanning, display and printing • Image and video processing, coding and compression • Pattern recognition and computer vision • Perceptual analysis of images and video • Image forensics and security • Machine Learning methods for signal image and video analysis • Virtual and augmented reality • Artificial Intelligence for weather and climate modelling • Applications
Information about dissemination activity	
Presentation title	• Context-Aware Simulation with Machine Vision for Industrial Safety • EAFvision: Real-Time Automated Safety Surveillance in Electric Arc Furnaces Using Deep Learning Models
Presenter	• Filippo Ghisi (UNIGE) • Marco Vannucci (SSSA)
Other partners involved	TENOVA
Hashtag(s) for Social Media	#steel #metallurgy #ElectricArcFurnace #ArtificialIntelligence #MachineLearning #ComputerVision #safety #training #SituationAwareness #Digitalization #TwinTransition
Attachments (e.g. agenda, invitation)	Program

Program

Time	Monday, October 13	Tuesday, October 14	Wednesday, October 15	Thursday, October 16
08:30	Reception	Reception	Reception	Reception
09:00		Keynote Speaker *Prof. Ahmed Bouridane*	Keynote Speakers *Prof. NGUYEN Linh Trung & Prof. Guy Nagels*	Tutorial *Associate Prof. İsmail Burak Parlak*
09:30	Opening Ceremony			
10:00	Keynote Speaker *Prof. Nizamettin Aydın*	Tea & Coffee Break	Tea & Coffee Break	Tea & Coffee Break
10:30		Special Session B	Special Session D	Regular Session 2D
11:00	Tea & Coffee Break			
11:30				
12:00	Regular Session 1	Regular Session 3	Regular Session 2B	
12:30				Closing Ceremony
13:15	Lunch Break	Lunch Break	Lunch Break	Lunch Break
14:30	Regular Session 2A	Regular Session 4	Regular Session 2C	
16:00	Tea & Coffee Break	Tea & Coffee Break	Tea & Coffee Break	
16:30	Special Session A	Special Session C	Special Session E	
18:00		(17:45) Regular Session 5	Regular Session 6	
19:00	Welcome Cocktail	Gala Dinner		

Color Legend: Speakers and Tutorials | Regular Sessions | Special Sessions | Breaks | Meals

DETAILED PROGRAM

October 13, 2025

14h30 Regular Session 2A: Pattern recognition and computer vision I

Chairs: İsmail Burak Parlak

MLP Fusion: Revisiting Convolutional Networks with Transformer-Based Insights
P56 Erfan Alizadeh Noohi (Bahcesehir University)*; Hassan Imani (Bahcesehir University); Md Baharul Islam (Florida Gulf Coast University)

Beyond Meme Templates: Limitations of Visual Similarity Measures in Meme Matching
P57 Muzhaffar Hazman (University of Galway)*; Susan McKeever (Technological University Dublin); Josephine Griffith (University of Galway)

Video-based Assessment of Bradykinesia in Ataxia-Teleangiectasia Patients
P39 Veronica Mattioli (University of Parma)*; Luca Pollini (Sapienza University of Rome); Elisa Siuda (ENSEIRB-MATMECA Bordeaux INP); Francesco Pisani (Sapienza University of Rome); Riccardo Raheli (University of Parma)

A Multi-Method Explainability Evaluation of a Graph-Based Neural Network for Alertness Detection
P45 Sara Zeynalpour (Italian institute of technology)*; Olivia Nocentini (Italian institute of technology); Marta Lagomarsino (Italian institute of technology); Marta Lorenzini (Italian institute of technology); Arash Ajoudani (Italian institute of technology)

Eye-Closure-Based Alertness Detection via Adaptive Eye Region Extraction and Deep Learning
P70 Olivia Nocentini (Italian Institute of Technology)*; Marta Lagomarsino (Italian Institute of Technology); Marta Lorenzini (Italian Institute of Technology); Alessandro Ledda (Italian National Institute for Insurance against Accidents at Work); Arash Ajoudani (Italian Institute of Technology)

FeDepthX : A Federated Learning Depth eXperiment
P101 David Fraux (Eviden)*

16h00 Tea and coffee Break

16h30 Special Session A: Visual Attributes, Optimization, and Transmission for Emerging Image and Vision Applications

Chairs: Dr. Md Baharul Islam, Dr. A.F.M. Shahen Shah

Evaluating Student's Attention: A Deep Learning Approach
P85 Fareeda Yeh (İstanbul Ticaret Üniversitesi); Md Imran Hosen (İstanbul Ticaret Üniversitesi)*; Feyza M. Hafızoğlu (İstanbul Ticaret Üniversitesi)

Dual-Graph Transformer with Contextual-Support Nodes for Interpersonal Relationship Recognition
P68 Simge Akay (Bahcesehir University); DUYGU CAKIR (Bahcesehir University)*; Nafiz ARICA (Piri Reis University)

End-to-End Microexpression Detection Using 3D Convolution and LSTM
P59 Md Imran Hosen (İstanbul Ticaret Üniversitesi)*; Ayla Gülcü (Bahçeşehir University)

Cross-domain adversarial structural deformation model for post-disaster image generation
P87 Chengyi Qu (Florida Gulf Coast University)*; Xiaodong Hao (Chang'an University); Jizhuang Hui (Chang'an University); Xu Huang (University of Missouri - Columbia); Wenbin Guo (University of Florida); Hong Wang (Hubei University)

Automatic insect pest identification and recognition for paddy crops pest control
P49 Md Roman Bhuiyan (Berlin School of Business and Innovation (BSBI))*; Md Baharul Islam (Florida Gulf Coast University); Junaidi Abdullah (Multimedia University, Cyberjaya, Malaysia); Farshad Badie (Berlin School of Business and Innovation (BSBI)); Giulio Napolitano (Berlin School of Business and Innovation (BSBI))

19h00 Welcome Cocktail

DETAILED PROGRAM

October 13, 2025

8h30 Reception

9h30 Opening ceremony

10h00 Keynote Speaker

Prof. Nizamettin AYDIN, Istanbul Technical University

TITLE: Engineering Approaches to Understanding Infertility, the Curse of Modern Societies

Chairs: Gülfem IŞIKLAR ALPTEKİN

11h00 Tea and coffee Break

11h30 Regular Session 1: Machine Learning methods for signal image and video analysis I

Chairs: İsmail Burak Parlak

Landmark-Based Fast Lip Reading with CTC Loss
P81 Oğuz Arslan (Istanbul Technical University)*; Doruk Üzgün (Istanbul Technical University); Batuhan Cengiz (Istanbul Technical University); Cihan Topal (Istanbul Technical University)

A Comparative Analysis of IR-VIS Image Fusion Methods: Object Detection with YOLO Architectures and Fusion Quality Evaluation
P47 Busra CELIK (ASELSAN INC.)*, Ibrahim Halil GIDEN (Aselsan Inc.); Kubilay AYTURAN (Gazi University); Firat HARDALAC (Gazi University)

Would A Simple Res-UNet Unsupervised Domain Adaptation Solve DubaiSAT2 Delineated Labels?
P123 Nour Aburaed (University of Dubai); Mina Talal Ahmed Al-Saad (University of Dubai); Marouane Tliba (University of Orleans)*, Aladine Chetouani (University of Sorbonne Paris North); Rachid Jennane (University of Orleans); Saeed Al-Mansoori (Mohammed Bin Rashid Space Centre); Hussain Al-Ahmad (University of Dubai)

Real-Time Detection and Classification of Drones, Vehicles, and Humans from Radar Data Using Deep Learning
P14 Ahmet Şenocaklı (Hacettepe Üniversitesi)*; Seniha Esen Yüksel (Hacettepe Üniversitesi)

DiffusionMixNet: Leveraging Foundation Models and Contrastive Learning for Semi-Supervised Polyp Segmentation
P83 Meriem SEBAI (University of Sciences and Technology Houari Boumediene)*

13h15 Lunch

October 14, 2025

8h30 Reception

09h00 Keynote Speaker

Prof. Ahmed BOURIDANE, University of Sharjah, UAE

TITLE: Digital Multimedia and Sensor Forensics and Security: Recent Advances

Chairs: Mouloud ADEL

10h00 Tea and coffee Break

10h30 Special Session B: Advanced Computer Vision Techniques for Object Detection, Tracking and Segmentation

Chairs: Sheli Sinha Chaudhuri, Khalifa Djemal, SoS Agaian

A Frequency-augmented CBAM Attention-aided YOLOv8 for Object Detection
P88 Sayani Dhar (Jadavpur University); ourajit Maity (Jadavpur University); Asfak Ali (Jadavpur University); Dmitrii Kaplun (Saint Petersburg Electrotechnical University "LETI")*; Daria Sidorina (Saint Petersburg Electrotechnical University "LETI"); Ram Sarkar (Jadavpur University)

A Modular System for Human Action Detection Combining YOLO and Transformer-based Video Understanding
P106 Awatef Edhib (Université Claude Bernard Lyon1)*; Achraf Chabbouh (Anavid); Ahmed Chaari (Anavid); Rostom Kachouri (LIGM Laboratory, A3SI Team, ESIEE Paris, Gustave Eiffel University)

AI-Driven Vehicle Damage Detection: A Saliency-Based Segmentation Approach
P78 SHEHZAD KHALID (Bahria University)*; Muhammad Hassan Aamir (Bahria University); Hasnain Ayaz (Bahria University); Arooj Yousaf (Bahria University)

Decoding UAV Scenes: A Novel Framework for Deep Semantic Segmentation using U-Net and Transformer Hybrids
P77 Syed Usman (Bahria University)*

YOLO-Based Waste Detection in Smart Waste Management for a Cleaner Future: A Review
P43 AVRA GHOSH (ETCE Department, Jadavpur University)*; Ayan Das (Jadavpur University); Saptarshi Garai (Jadavpur University); Anish Chanda (Jadavpur University); Sheli Sinha Chaudhuri (Jadavpur University); Khalifa Djemal (Paris-Saclay University); Amir Ali Feiz (Paris-Saclay University)

12h00 Regular Session 3: Applications I

Chairs: Dionysis GOULARAS

Next-Stitch Counting in Crochet Swatches via Multi-Class Semantic Segmentation
P64 Gamze Erdoğan (İstanbul Technical University)*

Which Image Quality Measure is Optimal for Ultrasound Imaging?
P80 Florian Nowicki (Vermon SA)*; Karim Abed-Meraim (PRISME Laboratory); David Savéry (Vermon SA); Rodolphe Weber (PRISME Laboratory)

AI-based Real-Time Fight Detection through CCTV Cameras
P111 Muhammad Mazhar Ullah Rathore (Lakehead University)*; Tayyab Ur Rehman Rathore (University of Azad Jammu and Kashmir); Shaheer Bashir (University of Azad Jammu and Kashmir); Saad Bin Ahmed (Lakehead University)

Deep Vision of Mobility for Urban Detection from Street-View Projections
P118 Burak Parlak (Galatasaray University)*; Mouloud Adel (Galatasaray University); Akın Akgül (Galatasaray University)

Does Brain Network Construction Choice Matter? An Empirical Study of Individual Networks from Static FDG-PET for Alzheimer's Diagnosis
P125 Minh Tuan Pham (Aix Marseille University)*; Julien Wojak (Aix Marseille University); Mouloud Adel (Aix Marseille University); Ismail Burak Parlak (Galatasaray University); Linh Trung Nguyen (Vietnam National University, Hanoi); Eric Guedj (Aix Marseille University)

13h15 Lunch

14h30 Regular Session 4: Image and video processing, coding and compression

Chairs: Dionysis GOULARAS

P44 **Deblurring Images by Huber Lasso**
Mustafa PINAR (Bilkent University)*; Emre Can Yayla (Bilkent University)

P48 **Knowledge Distillation for Resource Efficient Classification with CLIP-Guided Specialist Networks**
Emir Mehmet Eryilmaz (Ozyegin University); Ezgi Nur Alisan (Ozyegin University); Baturalp Bilgin (Ozyegin University); Ismail Akturk (Ozyegin University)*; Hasan Fehmi Ates (Ozyegin University)

P79 **Quality Versus Sparsity in Image Recovery by Dictionary Learning Using Iterative Shrinkage**
Shima Shabani (Brandenburg Technical University)*; Mohammadsadegh Khoshghiaferezaee (Brandenburg Technical University); Moritz Krauth (Brandenburg Technical University); Michael Breuß (Brandenburg Technical University)

P92 **Self Characterized Fusion Network for Prognosis of Brain Diseases**
Suranjana Mukherjee (ETCE, Jadavpur University); Sriparna Banerjee (ETCE, Jadavpur University)*; Sheli Sinha Chaudhuri (ETCE, Jadavpur University); Khalifa Djemal (IBISC, Univ de Evry)

16h00 Tea and coffee Break

16h30 Special Session C: Advances in Computational Medical Imaging – From Deep Learning to Generative AI

Chairs: Prof. S. Almaadeed, Prof. R. Hamoudi, Prof. A. Bouridane

P104 **Deep Learning-Based Automated Diagnosis for Breast Cancer Classification Using Mammogram Analysis**
Abdulrahman Aboumadi (Qatar University); Somaya Al Maadeed (Qatar University)*; Haya Al-Merekhi (Hamad Medical Corporation)

P89 **Beyond Static Fusion: A Mixture-of-Experts Framework for Multimodal Breast Cancer Classification**
Faseela Abdullakutty (Qatar University)*; Younes Akbari (Qatar University); Somaya Al Maadeed (Qatar University); Rafif Al Saady (Qatar University); Hadi Mohamad Abu Rasheed (Qatar Cancer Society)

P107 **Utilization of Diffusion Models for Noise Reduction in Ultrasound Images**
Peter Drotar (Technical university of Kosice)*; Branislav Setlak (Technical university of Kosice); Matej Gazda (Technical university of Kosice)

P126 **[Invited talk] Pathological Region Inpainting in MRI Data Using Generative AI**
Maxim Sharaev (Skoltech)*; Nadezhda Alsahanova (Skoltech); Pavel Bartenev (Skoltech); Rifat Hamoudi (University of Sharjah)

P127 **[Invited talk] Generative AI for Virtual Staining in Histopathological Data Analysis**
"Svetlana Illarionova (Skolkovo Institute of Science and Technology)*, Maxim Sharaev (Skolkovo institute of science and technology), Fedor Gubanov (Skolkovo institute of science and technology), Rifat Hamoudi (University of Sharjah)"

17h45 Regular Session 5: Applications II

Chairs: Khalifa DJEMAL

P122 **Towards Trustworthy Disaster Severity Scoring: Combining Semantic Alignment and Chain-of-Thought LLMs**
Fuzel Shaik (University of Oulu); Suvojit Acharjee (Saltlake University); Mourad Oussalah (University of Oulu)*

P109 **Deep-Learning Based Quality Assessment in Adaptive Optics Ophthalmoscopy Images**
Abir Aissa (ISEP)*; Florence Rossant (ISEP); Hélène Urien (ISEP); Michel Paques (15-20)

P50 **Combining EEG and MRI in a Multimodal Approach for Parkinson's Disease Characterization**
Annaëlle Jacob (Université de Rennes - LTSI)*, Johanne Bézy-Wendling (Université de Rennes - LTSI), Zheng Fang (Université de Rennes - LTSI), Fanny Noury (Université de Rennes - LTSI), Amar Kachenoura (Université de Rennes - LTSI), Laurent Albera (Université de Rennes - LTSI), Paul Sauleau (Université de Rennes - LTSI), Régine Le Bouquin Jeannès (Université de Rennes - LTSI)

P116 **Learning-Based Steering Estimation for Motorcycles via Visual-Inertial Fusion**
Hicham Hadj-Abdelkader (IBISC)*; Yingfeng Qian (IBISC Lab. Universoty of Evry Paris Saclay); Martin Pryde (IBISC Lab. Universoty of Evry Paris Saclay); Lamri Nehaoua (IBISC Lab. Universoty of Evry Paris Saclay); Hedi Tabia (IBISC Lab. Universoty of Evry Paris Saclay); Hichem Arioui (IBISC Lab. Universoty of Evry Paris Saclay)

19h00 Gala Dinner

October 15, 2025

8h30 Reception

09h00 Keynote Speakers

Prof. NGUYEN Linh Trung, Vietnam National University, Hanoi & Prof. Guy NAGELS, Vrije Universiteit, Brussel

TITLE: Machine Learning for Neuroimaging Diagnosis of Neurological Diseases

Chairs: Gülfem IŞIKLAR ALPTEKİN

10h00 Tea and coffee Break

10h30 Special Session D: Image Processing and Virtual Reality for Enhanced Industrial Safety, Training, and Operational Intelligence

Chairs: Charles Yaacoub, Jalal Possik, Marco Vannucci

P52 **Context-Aware Simulation with Machine Vision for Industrial Safety**
Xhulia Sina (Università degli Studi di Genova)*; Luca Cirillo (Università degli Studi di Genova); Agostino G. Bruzzone (Università degli Studi di Genova)

P71 **Cognitive Task Virtualization for Alzheimer's Disease Diagnosis Using Realistic VR Simulation.**
Christian Tjandra (Asia Pacific University of Technology and Innovation)*; Siti Azreena Mubin (Asia Pacific University of Technology and Innovation); Khalifa Djemal (Paris-Saclay University); Amir Ali Feiz (Paris-Saclay University)

P75 **Point Cloud Pretraining Dataset Effects on MaskPoint Classification Performance**
Rita Younes (Université Catholique de Lille); Roy Abi Zeid Daou (Université La Sagesse); Grace El Khoury (Université La Sagesse); Petra Bilane (Université Catholique de Lille); Jalal Possik (Université Catholique de Lille); Charles Yaacoub (Université Catholique de Lille)*

P96 **Curvature Dedicated Architecture using Swin Transformers for RGB-D Object Recognition**
Maxime Morisset (University of Bordeaux)*; Marc Donias (Bordeaux INP, University of Bordeaux); Christian Germain (Bordeaux Sciences Agro, Université de Bordeaux)

P61 **EAFvision: Real-Time Automated Safety Surveillance in Electric Arc Furnaces Using Deep Learning Models**
Muhammad Waseem Akram (Excellence in Robotics and AI, Pisa, Italy); Arslan Siddique (Institute TeCIP Institute, Pisa, Italy); Marco Vannucci (Institute TeCIP Institute, Pisa, Italy); Valentina Colla (Institute TeCIP Institute, Pisa, Italy); Giovanni Bavestrelli (Tenova Digital, Castellanza, Italy); Alessandro Zamproni (Tenova Digital, Castellanza, Italy)

12h00 Regular Session 2B: Machine Learning methods for signal image and video analysis II

Chairs: Aladine CHETOUANI

P31 **Knowledge Distillation Between 2D and 3D Vision Transformers for Point Cloud Quality Assessment**
salima bourbia (LRIT, Mohammed V University, | L@bISEN, Vision-AD, ISEN Yncréa Ouest/Nantes|Prisme, Orleans University)*; Ayoub Karine (Université Paris Cité, LIPADE, F-75006 Paris, France); Aladine Chetouani (Laboratoire L2TI - Sup Galilée, Université Sorbonne Paris Nord, Campus de Villetaneuse, Paris, France); Mohammed El Hassouni (FLSH, FSR, Mohammed V University in Rabat, Rabat, Morocco); Maher Jridi (L@bISEN, Vision-AD, ISEN Yncréa Ouest campus Nantes, Carquefou, France)

P53 **Towards Reliable Disaster Detection: Comparing Semantic and Heuristic Filters for Multimodal Data**
Fuzel Shaik (University of Oulu); Mourad Oussalah (University of Oulu)*; Sharamsh Koirala (University of Oulu); Qiqi Xie (Univeristy of Oulu); Sandali Vithanage (University of Oulu)

P62 **YOLOFeat: Unified Object Detection and Feature Extraction for Multi-Object Tracking**
Mohammed Bali (LIS (Université de Toulon))*; Vincente Guis (LIS (Université de Toulon)); Moez Bouchouicha (LIS (Université de Toulon)); Frederic Bouchara (LIS (Université de Toulon))

13h15 Lunch

14h30 Regular Session 2C: Pattern recognition and computer vision II

Chairs: Rostom KACHOURI

CLIP-HandID: Vision-Language Model for Hand-Based Person Identification

P84 Nathanael Lemessa Baisa (De Montfort University)*

Deep Learning-Based Segmentation of Hysteroscopic Images for Early Detection of Endometrial Cancer

P110 Burcu Selçuk (Yeditepe University)*; Aygegül Tekeli (Yeditepe University); Tacha Serif (Yeditepe University); Işın Yeşim Yeşilkaya Baylan (Yeditepe University Hospital); Erkut Attar (Yeditepe University Hospital)

Multi-view dispersion entropy on graphs: application to the detection of cerebral palsy after neonatal stroke

P84 Dmytro Polozenko (Université d'Angers, LARIS, SFR MATHSTIC); Clément Veyer (Université d'Angers, LARIS, SFR MATHSTIC)*; Patty Coupeau (Université d'Angers, LARIS, SFR MATHSTIC); Jean-Baptiste Fasquel (Université d'Angers, LARIS, SFR MATHSTIC); Lucie Hertz-Pannier (UNIACT/Neurospin/JOLIOT/DRF/CEA-Saclay, U1141 NeuroDiderot/Inserm, CEA); Mickael Dinomais (Université d'Angers, LARIS, SFR MATHSTIC Médecine physique et de réadaptation); Anne Humeau-Heurtier (Université d'Angers, LARIS, SFR MATHSTIC)

A multi-view graph approach for morphometry-aware semantic image segmentation.

P83 Clément Veyer (Université d'Angers, LARIS, SFR MATHSTIC)*; Patty Coupeau (Université d'Angers, LARIS, SFR MATHSTIC); Anne Humeau-Heurtier (Université d'Angers, LARIS, SFR MATHSTIC); Lucie Hertz-Pannier (UNIACT/Neurospin/JOLIOT/DRF/CEA-Saclay, U1141 NeuroDiderot/Inserm, CEA); Mickael Dinomais (Université d'Angers, LARIS, SFR MATHSTIC Dépt. de médecine physique et de réadaptation); Jean-Baptiste Fasquel (Université d'Angers, LARIS, SFR MATHSTIC)

Channel-Wise 1D Convolutional U-Net

P85 Sanghyun Byun (LG)*; Kayvan Shah (University of Southern California); Ayushi Gang (University of Southern California); Jacob Song (LG); Wooseong Chung (LG)

16h00 Tea and coffee Break

16h30 Special Session E: Machine Learning and Deep Learning for Medical Image Processing

Chairs: Sultan Turhan, Ozgun Pinarer, Jinan Fiaidhi, Sabah Mohammed

Chagas Parasite Semi-Supervised Classification in Blood Sample Images Using Different Deep Learning

P80 Preet Kumar (University of the West of England); Carlos Brito-Loeza (Universidad Autonoma de Yucatan); Lavdie Rada (Bahcesehir University)*

Robustness of Deep Learning-based for Acute Lymphoblastic Leukemia Detection and Classification

P82 Lynda Bounif (The university of science and technology Houari Boumediene)*; Amina Serir (USTHB)

Enhancing Breast Cancer Detection Using Multi-Stage Transformer with Positional Encoding and Feature Fusion

P41 Atta Ur Rahman (KFUPM Business School, King Fahd University of Petroleum & Minerals), Sania Ali (University of Science and Technology, Pakistan), Haseeb Nisar, (KFUPM Business School, King Fahd University of Petroleum & Minerals)

Explainable Artificial Intelligence Approach using low-dimensional visualization and ensembling uncertainty quantification for rare chromosomal aberration detection in cytogenetic imaging

P56 Antonin Deschemps (Centre Inria de l'Université de Rennes, France); Eric Grégoire (Autorité de sureté nucléaire et de radioprotection, Fontenay-aux-Roses, France); Juan S. Martinez (Autorité de sûreté nucléaire et de radioprotection, Fontenay-aux-Roses, France); Aurélie Vaurijoux (Autorité de sûreté nucléaire et de radioprotection, Fontenay-aux-Roses, France); Pascale Fernandez (Autorité de sûreté nucléaire et de radioprotection, Fontenay-aux-Roses, France); Delphine Dugue (Autorité de sûreté nucléaire et de radioprotection, Fontenay-aux-Roses, France); Emmanuel Moebel (Centre Inria de l'Université de Rennes, France); Gaëtan Gruel (Autorité de sûreté nucléaire et de radioprotection, Fontenay-aux-Roses, France); Mohamed Amine Benadjaoud (Autorité de sûreté nucléaire et de radioprotection, Fontenay-aux-Roses, France); Charles Kervrann (Centre Inria de l'Université de Rennes, France)

An Edge Feature Inclusive Variational Graph Autoencoder for PET-Driven Alzheimer's Diagnosis

P121 Saruhan Gürbüz (Galatasaray University)*; Mouloud Adel (Aix Marseille University)

Hybrid Deep Learning and Handcrafted Feature Fusion for Mammographic Breast Cancer Classification

P95 Maximilian Tschuchnig (Salzburg University of Applied Sciences)*; Michael Gadermayr (Salzburg University of Applied Sciences); Khalifa Djemal (University of Evry Paris-Saclay)

18h00 Regular Session 6: Applications III

Chairs: Amir FEIZ

Evaluating Spherical Gaussian Fuzzy Sets in Image Enhancement

P120 Burak Parlak (Galatasaray University)*; Mouloud Adel (Galatasaray University); Salah Bourennane (Institut Fresnel)

MS-DSCLNet: A Multi-Scale Dual-Stream Contrastive Learning Network for Image Tampering Detection and Localization

P54 Maryam Munawar (University of Oulu)*; Mourad Oussalah (University of Oulu)

Real-Time Detection of Road Defects Using YOLO Architectures: A Comparative Study

P108 Oumaima Khlifati (Civil and Environmental Engineering Laboratory (LGCE), Mohammadia Engineering School, Mohammed V University Rabat, Morocco)*; Khadija Baba (Civil and Environmental Engineering Laboratory (LGCE), Mohammadia Engineering School, Mohammed V University Rabat, Morocco); Amir Ali Feiz (University of Evry Paris Saclay, LMEE Evry, France); Djemal Khalifa (University of Evry Paris Saclay, IBISC Evry, France)

Prediction of Vitamin D Deficiency Using Machine Learning, Deep Learning, and a Hybrid Model

P80 Gulay Cicek (Beykent Universitesi)*; Ahmet Arif İsen (Istanbul Beykent Universitesi); Defne Küpeli (Istanbul Beykent Universitesi)

October 16, 2025

8h30 Reception

09h00 Tutorial

Asst. Prof. Ismail Burak Parlak, Galatasaray University, Istanbul

TITLE: Smart Vision Systems: Exploring the Power of YOLO and DeepLab in Image Processing Frontiers

Chairs: Mouloud ADEL

10h00 Tea and coffee Break

10h30 Regular Session 2D: Pattern recognition and computer vision III

Chairs: Charles YAACOUB

Automatic Turkish Image Captioning Using Non-native Deep Caption Generator Models and Neural Machine Translators

P36 Serdar Yıldız (Yıldız Technical University)*; Abbas MEMİŞ (İstanbul University)

Fungi or Fatal: Ensemble Learning for Mushroom Edibility Classification in the Wild

P82 Zehra Demir (Istanbul Technical University); Hakan Erdem (Istanbul Technical University)*; Batuhan Cengiz (Istanbul Technical University); Cihan Topal (Istanbul Technical University)

Human Pose Estimation Under Occlusion: A Data Restoration Framework Using GANs

P124 Gülşah Gökhan Gökçek (Yeditepe University)*, Dionysis Goularas Department of Computer Engineering, Yeditepe University, Istanbul, Türkiye

Invariants of Color Images to N-Fold Symmetric Out-of-Focus Blur

P38 Václav Košík (UTIA, Czech Academy of Sciences)*; Jan Flusser (UTIA, Czech Academy of Sciences)

Non-Invasive Neonatal Jaundice Detection via Two-Phase Self-Supervised Learning and Vision Transformer

P67 Fati Oiza Salami (Laboratoire Images, Signaux et Systèmes Intelligents (LISSI) EA 3956, Université Paris Est Créteil (UPEC), 94600, Vitry Sur Seine)*, Youssef Mourchid (CESI LINEACT Laboratory, UR 7527, 21000, Dijon); Muhammad Muzammel (Laboratoire Images, Signaux et Systèmes Intelligents (LISSI) EA 3956, Université Paris Est Créteil (UPEC), 94600, Vitry Sur Seine); Alice Othmani (Laboratoire Images, Signaux et Systèmes Intelligents (LISSI) EA 3956, Université Paris Est Créteil (UPEC), 94600, Vitry Sur Seine)

Bayesian Optimization Based Deep Learning Models for Detection of Forest Fires

P29 Baruch Shem (EMU); Erhan Ince (EMU)*

Conditional GAN for Time-to-Peak (TTP) Generation from Non-Contrast MRI Modalities

P58 Mariana Brejo (Université Évry Paris-Saclay)*; Hichem Maaref (Université Évry Paris-Saclay); Sadia Ahsan (Université Évry Paris-Saclay); Vincent Vigneron (Université Évry Paris-Saclay); Andreia Faria (Johns Hopkins University)

From Pixels to Panoramas: A Deep Learning Pipeline for Mineral Image Analysis

P90 Alexander Khvostikov (Lomonosov Moscow State University)*, Gleb Nikolaev (Lomonosov Moscow State University); Svetlana Krasnova (Lomonosov Moscow State University); Dmitry Korshunov (Russian Academy of Sciences); Mikhail Boguslavsky (Lomonosov Moscow State University); Andrey Krylov (Lomonosov Moscow State University)

12h30 Closing Ceremony

13h15 Lunch

6.3 ESTEP Annual Event 2025

Event information	
Event name (and acronym)	ESTEP Annual Event 2025: How decarbonisation, digitalisation and circular solutions forge the sustainable European steel future
Type of event	Conference
Date	October 20-30, 2025
Location	Udine (Italy)
Geographic coverage	Europe
Type of audience	Steel Companies, OEMs, RTOs, Academia.
Approximate size of audience	≈200
Short description	The ESTEP Annual Event 2025 aims at bringing together the European steel community to explore research and innovation in decarbonization, digitization, and circular solutions that will shape the sustainable future of the European steel industry. Achievements, challenges, and future perspectives will be examined through contributions from diverse European steelmaking stakeholders and presentations of ongoing projects under the Clean Steel Partnership. The event will foster dialogue between the steel sector and other key industries engaged in the European Green Deal—such as for e.g. cement, water, and aluminium—to promote industrial symbiosis and cross-sector collaboration. The topics of the event were: • Decarbonisation • Digitalisation upskilling and social innovation • Circular economy • Resource and energy efficiency Industrial symbiosis and sector coupling
Information about dissemination activity	
Presentation title	Enhancing Steelmaking Operations through Advanced Computer Vision and Machine Learning within the iSteel-Expert Project
Presenter	Giovanni Bavestrelli (TENOVA)
Other partners involved	SSSA, Siderpotenza
Hashtag(s) for Social Media	#steel #training #digitalisation #EAF
Attachments (e.g. agenda, invitation)	Program

ESTEP Annual Event 2025

Programme

28-30 October 2025

How decarbonisation, digitalisation and circular solutions forge the sustainable European steel future

WEDNESDAY 29 - DAY 1

08:30 - 09:00	Registration	
09:00 - 09:30	**Opening and welcome**	Marco Ometto, *Conference Chairman, Danieli Automation* Klaus Peters, *Secretary General, ESTEP* Angelo Montanari & Roberto Pinton, *Rector & past-Rector, University of Udine* Alessandro Brussi, President, *Danieli Group* Guido Nassimbeni, *Vice President, Friuli Foundation* Cosmo Di Cecca, *Vice President, AIM - Associazione Italiana di Metallurgia*
DIGITALISATION		Valentina Colla, *Session chairwoman, Scuola Superiore Sant'Anna Pisa*
09:30 - 09:50	**A multidisciplinary discussion on the future of steelmaking in the Triveneto region by 2050: the think tank experience**	Alex Lanzutti, *University of Udine*
09:50 - 10:10	**Artificial intelligence governance, economics, and manufacturing: an overview**	Costanzo Pietrosanti, *Danieli Automation*
10:10 - 10:30	**Digitalization: The universal environmental data model - the PRISMA project**	Eric Chiquito, *Luleå University of Technology*
10:30 - 10:50	**ALCHIMIA: Federated and continual learning for sustainable and competitive steelmaking**	David Blazquez, *CELSA*
10:50 - 11:10	**Forging the future. The evolution of automation in steel manufacturing (1974 to present)**	James Kellams, *Metallus*
11:10 - 11:30	Coffee break	

Programme DAY 1

How decarbonisation, digitalisation and circular solutions forge the sustainable European steel future

DIGITALISATION, UPSKILLING & SOCIAL INNOVATION		Luca Piedimonte, *Session chairman, ORI Martin*
11:30 - 11:50	**Ladle furnace optimization through artificial intelligence-based methodologies: a case study of the ALCHIMIA project**	Stefano Pede, *Scuola Superiore Sant'Anna Pisa*
11:50 - 12:10	**Driving quality innovation in steelmaking through digital solutions**	Luca Cestari, *Danieli Automation*
12:10 - 12:30	**Enhancing steelmaking operations through advanced computer vision and machine learning within the iSteel-expert project**	Giovanni Bavestrelli, *Tenova*
12:30 - 12:50	**Skills4Energy intensive industries: Game changer profiles and urgent skills demands for the steel industry**	Antonius Schröder, *TU Dortmund*
12:50 - 13:10	**The RACE programme: Bridging students and industry to foster innovation and reframe perceptions of steel** **DI-TRODE: An AI-Powered approach to securing the future of electrodes in the steel industry**	Fabio Ferri, *EIT Raw Materials* Philemon Adeyemi, Ahmed Alduwayb, Julia Kulpa & Leonidas Spandagos, *RACE programme*
13:10 - 14:30	Lunch break	
INDUSTRIAL SYMBIOSIS AND SECTOR COUPLING		Enrico Malfa, *Session chairman, Tenova*
14:30 - 14:50	**Automated copper identification in ferrous scrap using advanced machine learning for sustainable steel production**	Alice Petrucciani, *Scuola Superiore Sant'Anna Pisa*
14:50 - 15:10	**SLAG2BUILD: State of the art in dry granulation of ladle furnace slag**	Edoardo D'Amanzo, *RINA-CSM*
15:10 - 15:30	**Insights from current steel and slag production for next-generation processes**	Agnieszka Morillon, *FEhS* Marta Guzzon, *Tenova*
15:30 - 15:50	**MemKoWI & sector coupling with Power4Steel: New findings with pilot-scale CO2- and H2-separation by membrane technology from industrial gases from steel-, cement- and biomass-plants.**	Torsten Brinkmann, *Hereon* Susanne Bethlehem-Seidel, *Dillinger*
15:50 - 16:10	**Intelligent water management in steelmaking: Automation for process efficiency and sustainability**	Marcellino Fornasier, *Danieli & C Officine Meccaniche* Enrico Stefanel, *Danieli Automation*
16:10 - 16:30	Coffee break	

Programme DAY 1 & 2

How decarbonisation, digitalisation and circular solutions forge the sustainable European steel future

ENERGY EFFICIENCY		Alexander Thekale, *Session chairman, Primetals Technologies*
16:30 - 16:50	**Flex4Fact: Unlocking energy flexibility for a competitive and sustainable European steel industry**	Irene Garcia, *CELSA*
16:50 - 17:10	**From scrap to strip: Sustainable steel manufacturing with electrified direct casting and rolling**	Riccardo Conte, *Danieli & C Officine Meccaniche*
17:10 - 17:30	**Decarbonizing steelmaking downstream processes with breakthrough heating technologies enabling efficient renewable energy consumption: the E-ECO Downstream overall concept**	Valentina Colla, *Scuola Superiore Sant'Anna Pisa*
17:30 - 17:50	**Applications of computational fluid dynamics simulations to hydrogen combustion in industrial-scale heating processes of the steel industry**	Johannes Losacker, *RWTH Aachen*
20:00	Dinner - Casa della Contadinanza *Address restaurant in the Udine Castle : Piazzale del Castello, 33100 Udine*	

THURSDAY 30 - DAY 2

08:30 - 08:45	Registration	
08:45 - 08:50	**Opening and welcome**	Marco Ometto, *Conference Chairman, Danieli Automation* Klaus Peters, *Secretary General, ESTEP*
08:50 - 09:10	**Opening lecture - European Commission**	Sebastiano Fumero, *Head of Unit, European Commission (REA)* Cyril Robin-Champigneul, *Deputy Head of Unit, European Commission (DG RTD)*
DECARBONISATION SESSION 1		Ismael Matino, *Session chairman, Scuola Superiore Sant'Anna Pisa*
09:10 - 09:30	**High-temperature electrolysis for decarbonisation of the steel sector: the SYRIUS project, a real-scale demonstration**	Stefano Campanari, *Politecnico di Milano*
09:30 - 09:50	**Update on Hy4Smelt - Hydrogen-based direct reduction and smelting of ultra-fine iron ores to green hot metal**	Thomas Bürgler, *K1-MET* Christoph Prietl, *Primetals Technologies*
09:50 - 10:10	**CUSTARD - carbon capture and use at a steel plant with an advanced solution to reach decarbonisation**	Giuseppe Giacomini, *Acciaierie Bertoli Safau*
10:10 - 10:30	**Sustainable steel production : the role of carbon capture and utilization in a steelmaking plant**	Selena Tiburzio, *Danieli Research Center*

Programme DAY 2

How decarbonisation, digitalisation and circular solutions forge the sustainable European steel future

10:30 - 10:50	Coffee break	
DECARBONISATION SESSION 2		Thomas Echterhof, *Session chairman, RWTH Aachen*
10:50 - 11:10	**Operation of a 1 TPD mobile CO2 capture unit based on cryogenic desublimation in heavy industry plants in Belgium**	Jean Borlée, *CRM Group*
11:10 - 11:30	**Advancing decarbonization in ironmaking: progress and future directions of the electrically assisted syngas smelter (EASyMelt)**	Maryam Baniasadi, *SMS Group*
11:30 - 11:50	**Demonstration of decarbonization approaches in EAF: current achievements and ongoing activities of GreenHeatEAF project**	Ismael Matino, *Scuola Superiore Sant'Anna Pisa*
11:50 - 12:10	**Hybrid technologies for sustainable steel reheating : HyTecHeat project**	Filippo Cirilli, *RINA-CSM*
12:10 - 12:30	**LIFE project H2Reuse: Highly efficient and sustainable decarbonisation of bright annealing process by recovery and reuse of H2**	Mauro Leali, *DMV Italia*
12:30 - 13:50	Lunch break	
DECARBONISATION SESSION 3		Patrick Lafontaine, *Session chairman, ESTEP*
13:50 - 14:10	**Evaluation of hydrogen permeability and embrittlement in critical components for H_2 supply systems**	Eduardo Tabares, *Tekniker*
14:10 - 14:30	**Techno-economic assessment of H_2-DRI and NG-DRI-CCS - processes for low-emission iron production**	Sara Guazzi, *Politecnico di Milano*
14:30 - 14:50	**EU-project H2loop: Decarbonizing the EU steel industry through innovative carbon dioxide separation and hydrogen production from metallurgical gases**	Uwe Pahl, *Rouge H2 Engineering AG*
14:50 - 15:10	**Hydra project: status of activities and first operational results**	Filippo Cirilli, *RINA-CSM*
15:10 - 15:30	**Flexible DRI operation with high-temperature electrolysis for cost-effective iron decarbonization**	Marco Ficili, *Politecnico di Milano*
15:30 - 15:40	**Closing**	Marco Ometto, *Conference Chairman, Danieli Automation* Klaus Peters, *Secretary General, ESTEP*
15:40	End of conference - Farewell coffee	

6.4 DTMI 2025

Event information	
Event name (and acronym)	International Workshop Carlo Longaretti on Digital Tools for the Metallurgical Industry - DTMI 2025
Type of event	Conference (Scientific Event)
Date	November 27-28, 2025
Location	Bergamo, Italy
Geographic coverage	Italy, Europe
Type of audience	Experts in digital tools for the steel and metal sectors, PhD students, Industry
Approximate size of audience	81 persons.
Short description	The Workshop was performed through invited presentations and on the basis of the selection of the abstracts sent by authors and companies interested in sharing their updated knowledge on the following topics. The following topics were considered: • Artificial Intelligence Tools and Application • Data Mining and Machine Learning Tools • Computational simulation and modeling • Simulations of metallurgical phenomena • Improvement of the process efficiency • Digital Twins • Application of digital tools for quality assurance • Innovative computational approach • Control and simulation of Plastic Deformation • Control and simulation of Melting and Solidification Process • Control and simulation of the Thermal Treatments • Simulation of Microstructural Evolution • Robotics • Recent Trends and Developments • Succeful and promising applications of the digital tools in the metallurgical fields
Information about dissemination activity	
Presentation title	• Digital Transformation in Steel Manufacturing: An AI-Driven Monitoring and Safety Framework for EAF Operations. • Improving steelmaking operations through advanced computer vision and machine learning within the iSteel-Expert Project.
Presenter	• Valentina Colla (SSSA) • Giovanni Bavestrelli (Tenova)
Other partners involved	Siderpotenza
Hashtag(s) for Social Media	#steel #training #digitalisation #EAF
Attachments (e.g. agenda, invitation)	Program

DTMI 2025

International Workshop Carlo Longaretti on Digital Tools for the Metallurgical Industry

BERGAMO · ITALY · 27-28 NOVEMBER 2025

PROGRAMME

ORGANISED BY

ASSOCIAZIONE ITALIANA DI METALLURGIA

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DTMI 2025

International Workshop Carlo Longaretti on Digital Tools for the Metallurgical Industry

BERGAMO · ITALY · 27-28 NOVEMBER 2025

THURSDAY - 27 NOVEMBER 2025

DTMI 2025, the International Workshop Ing. Carlo Longaretti on Digital Tools for the Metallurgical Industry, will be an international meeting of excellent level for sharing knowledge and results about the applications of Artificial Intelligence, Machine Learning, Computational Simulation and Data Protection in the metallurgical fields. Theory, methodology, results and further potentialities will be dealt with. The aim of the Workshop is to provide a platform where researchers and practitioners from both academia will meet and share cutting-edge development about the aspects that are ruling the digital transitions.

Authors are invited to contribute to the Workshop by submitting presentations that illustrate research results, projects, surveying works, successful histories and industrial experiences that describe significant advances in the areas of computer science, engineering and applications applied to the Metallurgical sector.

WORKSHOP CHAIRPERSON

Carlo Mapelli – Politecnico di Milano

ORGANISING COMMITTEE

Paola Bassani - CNR ICMATE
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Cristian Viscardi - Ecotre Valente
Alessandro Zago - Cogne Acciai Speciali

DTMI 2025

International Workshop Carlo Longaretti on Digital Tools for the Metallurgical Industry

BERGAMO · ITALY · 27-28 NOVEMBER 2025

THURSDAY - 27 NOVEMBER 2025

PROGRAMME

9:15 **Registration**

9:50 **Welcome addresses**
Silvano Panza - AIM President
Carlo Mapelli - Workshop Chairperson and Politecnico di Milano

10:05 **Longaretti Award**

10:15 **Tiziano Valente Master Thesis Award**

ARTIFICIAL INTELLIGENCE FOR QUALITY CONTROL AND INSPECTION

10:30 DTMI_001 **Synchronization of defect detection systems using EDDY Currents with machine vision systems and automatic classification using AI**
P. G. Jesus - Ingeniería y Sistemas de Ensayos No Destructivos (ISEND), Spain

10:55 DTMI_003 **LOGITOM - Use of tomography and AI algorithms for foundry casting quality control and automatic recognition of casting defects**
A.F. Ciuffini, A. Autret, L. Gueye, D. Nguyen - Novitom, France

11:20 **Coffee break**

DTMI 2025

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THURSDAY - 27 NOVEMBER 2025

ARTIFICIAL INTELLIGENCE FOR QUALITY CONTROL AND INSPECTION

11:45 DTMI_006 **Deep learning-powered system for automated detection and quantification of Vickers indentations**
F. Bertolini, M. Mariani, N. Lecis - Politecnico di Milano, Italy

12:10 DTMI_013 **Improving scrap quality in EAF steelmaking through AI-driven copper recognition**
A. Petrucciani, V. Colla, M. Vannucci, A. Siddique - TeCIP institute - Scuola Superiore Sant'Anna, Italy
M. Ometto, M. Meneghin, C. Pietrosanti - Danieli Automation, Italy

12:35 DTMI_027 **From expertise to automation: applying Artificial Intelligence to metallographic analysis**
D. Lussana - Cogne Acciai Speciali, Italy
L. Lozza - Orobix, Italy

13:00 **Lunch**

DIGITAL TWIN AND NUMERICAL SIMULATION FOR INDUSTRIAL PROCESSES

14:00 DTMI_020 **A model-based approach for real-time rolling force calculation**
G. Steiner, B. Tian, S. Tolliner, J. Astelhuber, S. Kleber - voestalpine BÖHLER Edelstahl, Austria

14:25 DTMI_008 **Draco in Horizon: the digital twin and FEM-Based app for optimizing wire rod thermal treatment**
L. Ferro, I. Coulibaly, D. Magni, A. Mazzarano, A. Nardini - POMINI Long Rolling Mills, Italy

DIGITAL TWIN AND NUMERICAL SIMULATION FOR INDUSTRIAL PROCESSES

15:00 DTMI_012 **A simulation-based digital tool for optimizing the steel heating process**
E. D'Amanzo, M. Gilli, D. Fera, V. Varchetta - RINA-Centro Sviluppo Materiali, Italy

15:25 DTMI_014 **Towards integrated machine learning in the engineering design cycle - Incorporating AI in manufacturing processes simulations**
F. Fracasso, M. Chenaud, J. Alves – Transvalor, France

15:50 Coffee break

16:15 DTMI_009 **Horizon by POMINI Long Rolling Mills: a digital twin platform driving innovation in mill design, process simulation and operation**
D. Magni, I. Coulibaly, M. Cozzi, A. Mazzarano, A. Nardini - POMINI Long Rolling Mills, Italy

16:40 DTMI_004 **High-fidelity and fast simulation of X-ray tomographic imaging systems with integrated scatter modelling via Novi-Sim**
A. Autret, D. Neffati, T. Bertheas, B. Fayard, A.F. Ciuffini - Novitom, France

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IIOT PLATFORMS, MONITORING AND SAFETY SYSTEMS

17:05 DTMI_019 **Framework with digital twins and federated learning for decision support in multi-plant schemes for electric steelmaking and beyond**
P. Kannisto, B. Kleimt, A. Chandgude - BFI - VDEh-Betriebsforschungsinstitut, Germany
N. García Crespo, I. Guardiola Luna - EVIDEN, Spain
S. Dettori, V. Colla - Scuola Superiore Sant'Anna, Italy
B. Fernandez - Celsa Group, Spain

17:30 DTMI_011 **Digital transformation in steel manufacturing: An AI-driven monitoring and safety framework for EAF operations**
V. Colla, M. Waseem Akram, A. Siddique, M. Vannucci - TeCIP institute - Scuola Superiore Sant'Anna, Italy
G. Bavestrelli - Tenova, Italy

17:55 DTMI_016 **Digital manufacturing for the development of new rolling mill for beams**
F. Venturi, M. Moretti – Duferco Group, Italy
L. Valente, C. Viscardi, F. Ricchini, S. Bertoni – Ecotre Valente, Italy

18:20 DTMI_007 **HORIZON's holistic IIoT and AI-powered apps ecosystem to drive effectiveness across plant, process, and product**
M. Cozzi, D. Magni, A. Mazzarano, A. Nardini - POMINI Long Rolling Mills, Italy

19:30 CONFERENCE DINNER

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THERMAL, THERMO-MECHANICAL AND PROCESS MODELLING

8:45 DTMI_025 **From text to production: LLM-driven knowledge extraction in casting manufacturing**
X. Liu, J. Ying Hsi Fuh, W. Feng Lu - National University of Singapore, Singapore
Z. Li - Comptech i Skillingaryd AB, Sweden; Jönköping University, Sweden
B. Li - California State University Northridge, USA
H. Tan, A.E.W. Jarfors - Jönköping University, Sweden
P. Jansson - Comptech i Skillingaryd AB, Sweden

9:10 DTMI_017 **Forecast of deformation deriving from heat treatment**
C. Viscardi – Ecotre Valente, Italy
N. Barone – Malvestiti Group, Italy
V. Vicario – Soliveri, Italy

9:35 DTMI_018 **Bridging material characterization and process innovation through integrated numerical and physical simulation**
M. E. Palmieri, M. Villa, L. Tricarico - Politecnico of Bari, Italy

10:00 DTMI_024 **Development of a kinetic model using thermodynamic tools of the blister copper deoxidation process with hydrogen-rich gas mixtures**
A. Rivera, F. A. López, C. Celada-Casero - CSIC, Spain

10:25 coffee break

10:50 DTMI_021 **Rethinking heat treatment signals through artificial intelligence**
K. M. Winter - UPC -Marathon a Nitrex Company, Germany

11:15 DTMI_015 **Numerical tool for HTC simulation in BICS cooling systems**
D. Arnone, V. Battaglia - Cometal Engineering, Italy

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PROCESS OPTIMIZATION AND SUSTAINABILITY THROUGH AI AND MODELLING

11:40 DTMI_002 **Multi-modal AI implementation for slag property and allow prediction in EAF operations: operational validation access three steel producers**
P. Ozbay - Fero Labs, USA

12:05 DTMI_005 **Investigation of flatness defects during annealing: a combined approach using heat transfer measurements, thermal and mechanical simulations**
N. Rademacher, D. Büschgens, M. Eickhoff, H. Pfeifer, C. Wuppermann - RWTH Aachen University, Germany

12:30 lunch

13:30 DTMI_010 **Scalable transient modeling of multiphase reactions in iron ore sintering**
A. V. Walk - TU Wien, Austria; K1-MET, Austria
M. Boeberl, B. Weiss - Primetals Technologies Austria, Austria
B. Rummer, A. Spanlang - voestalpine Stahl, Austria
W. Wukovits - TU Wien, Austria

13:55 DTMI_028 **Improving steelmaking operations through advanced computer vision and machine learning within the iSteel-Expert Project**
G. Bavestrelli, Renato Girelli - Tenova, Italy
M. Vannucci - Scuola Superiore Sant'Anna, Italy
S. De Sio, V. Orlando - Pittini Siderpotenza, Italy

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14:20 DTMI_026 **Machine learning-driven prediction of steel microstructure via chained SVR and JMAK models: A metallurgically-informed visualization approach with novel closeness metrics**
S. Razzi, C. Mapelli, D. Mombelli - Politecnico di Milano, Italy
R. Nemfardi, R. Bedini, G. Zucchelli - Eure Inox, Italy

14:45 DTMI_022 **Process and energy optimization of the Waelz Kiln. Advanced simulation modelling through industrial process modelling tools and machine learning techniques for zinc recovery**
D. Babar, D. Bonaldi - Pontenossa, Italy
G. Dolci, L. Cretarola - Politecnico di Milano, Italy

15:10 **End of the workshop**

PRELIMINARY PROGRAMME SUBJECT TO CHANGES
Updated on October 31, 2025

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VENUE
The Workshop will be held in Bergamo at the Congress Center Giovanni XXIII, Viale Papa Giovanni XXIII, 106 (www.congresscenter.bg.it).

ACCOMMODATION >>link

LANGUAGE
The official language of the Meeting will be English.

PROCEEDINGS
All participants will receive the PDF presentations at the Meeting.
Authors interested in writing full papers for publication on "La Metallurgia Italiana - International Journal of the Italian Association for Metallurgy" (the scientific journal of AIM, which is covered in the Science Citation indexed by Clarivate Analytics (formerly Thomson Reuters), and in Scopus by Elsevier B.V) are invited to inform the Editorial Secretariat (met@aimnet.it).

ADVANCED REGISTRATION
If you plan to attend, please register online on the Meeting website https://www.aimnet.it/eng/ or fill in the PDF registration form and send it to conference@aimnet.it best **before November 11, 2025** (early-bird registrations deadline).
Please use a separate form for each participant.
Please contact the Organizing Secretariat by fax or e-mail, if possible.

PAYMENT AND REMITTANCE
- by bank transfer, to the order of Associazione Italiana di Metallurgia - AIM at "CREDITO EMILIANO SpA", Branch no. 052 Milano Sede – Via Andegari, 14 - 20121 Milano - Italy, account no. 010000480455 cod. ABI 03032 - CAB 01600 - cin M - IBAN: IT33M0303201600010000480455, swift code BACRIT22ML. The transfer order must specify the name of the participant and the reference "**DTMI 2025**". A copy of the transfer order must be sent to AIM, together with the Registration Form.
- by credit card online (https://www.aimnet.it/eng/pagamento.php).

CANCELLATION AND REFUND POLICY
A refund, less 20% deduction for administrative costs, will be issued for written cancellations received by November 10, 2025. For attendees who notify their cancellation **after November 11, 2025,** or will not attend the conference, a charge of 100% of the conference fee will be withheld and a copy of all presentations will be sent after the event.

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	AIM MEMBER	NON-MEMBER
• SPEAKER • SESSION CHAIRPERSON • COMMITTEE MEMBER	€ 410 after 11 November € 470	€ 490 after 11 November € 550
• PARTICIPANT (NON-PRESENTER)	€ 480 after 11 November € 540	€ 560 after 11 November € 620

For non-members, the fee includes AIM Membership for the last quarter of 2025 and for the year 2026

STUDENT **Student will have to provide valid proof of student status.**	€ 360 (VAT included)	€ 400 (VAT included) after 11 November

Additional ticket for Meeting dinner for accompanying persons: € 100 (VAT included)
(Includes only the Meeting dinner on November 27, 2025)

MEETING REGISTRATION FEES INCLUDE:
- Admittance to the technical sessions
- Meeting bag with electronic proceedings
- Meeting dinner on November 27
- Coffee breaks and lunch

SPEAKERS REGISTRATION
Please be aware that only presentations submitted on time and with presenting author regularly registered (registration fee paid) **before October 31, 2025,** will be included in the final programme and distributed to all attendees.
Registration forms will not be processed without payment. A maximum of two presentations will be accepted for each speaker registered in time.

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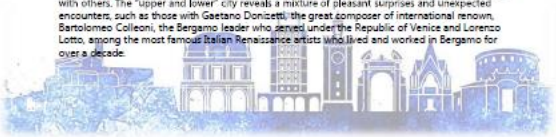
SPEAKERS CANCELLATION AND REFUND POLICY
A refund, less 20% deduction for administrative costs, will be issued for written cancellations received by **October 31, 2025.** For speakers who notify their cancellation **after October 31, 2025,** or will not attend the Meeting, **a charge of 100% of the conference fee will be withheld.** Their presentations will be distributed anyway, and a copy of all presentations will be sent after the event

MEETING DINNER
In order to give attendees, the opportunity to meet informally, AIM organized a Workshop dinner will be held in the evening of November 27 – at 19:30 - at HOTEL SAN MARCO - Piazzale della Repubblica 6, Bergamo.

EXHIBITION & SPONSORSHIP OPPORTUNITIES
All information are available at: DTMI-25 Sponsorship

INSURANCE
The Organizing Secretariat cannot assume any responsibility for personal accident, loss or damage to the private property of participants and accompanying persons, which may either occur during or arise from the Meeting. Participants should therefore take whatever steps they consider necessary as regards insurance.

BERGAMO
Bergamo greets visitors with its Venetian Walls. Surrounded by rivers and lush, verdant valleys, crossed by paths that widen to Parco dei Colli, the area's largest park, the city looks like a lounge filled with art, culture and nature, with a fascinating and complex history just waiting to be shared with others. The "upper and lower" city reveals a mixture of pleasant surprises and unexpected encounters, such as those with Gaetano Donizetti, the great composer of international renown, Bartolomeo Colleoni, the Bergamo leader who served under the Republic of Venice and Lorenzo Lotto, among the most famous Italian Renaissance artists who lived and worked in Bergamo for over a decade.



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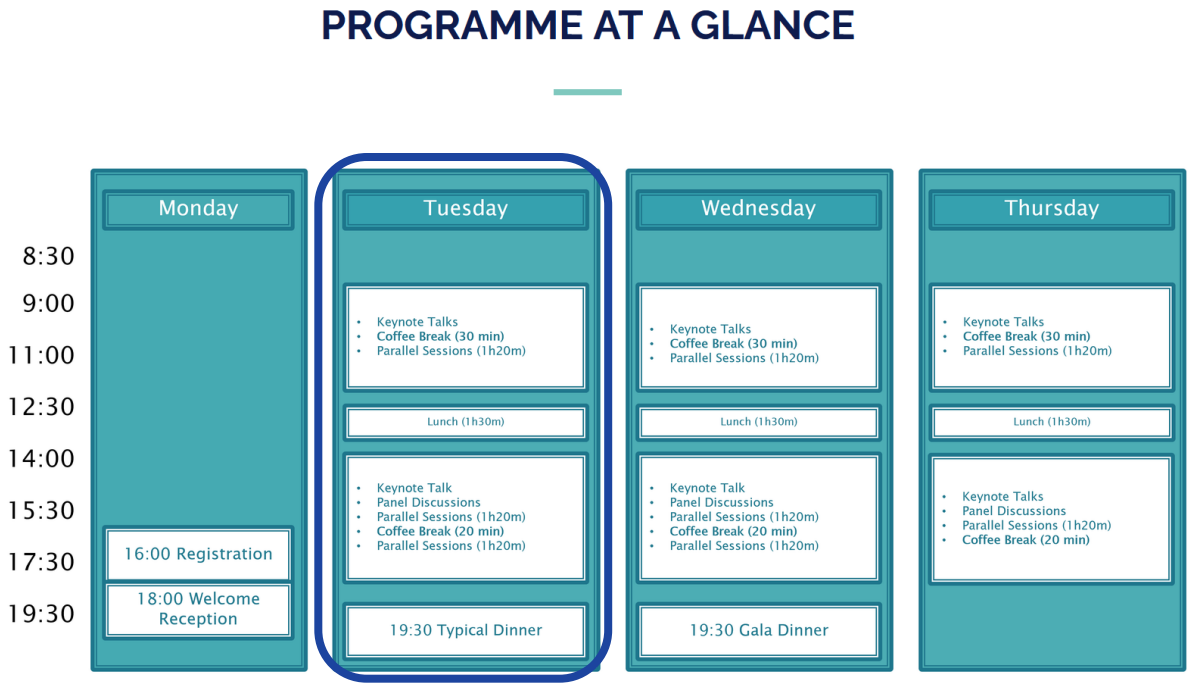
6.5 I-ESA 2026

Event information	
Event name (and acronym)	I-ESA (Interoperability for Enterprise Systems and Applications) Conference 2026
Type of event	Conference (Scientific Event)
Date	April 13-16, 2026
Location	Funchal (Madeira Islan), Portugal
Geographic coverage	Europe
Type of audience	Software experts, PhD students, Industry
Approximate size of audience	≈150 persons.
Short description	The I-ESA conference series is the premier international forum for advancing Enterprise Interoperability (EI) - the capacity of organizations and systems to seamlessly collaborate, exchange information, and operate across technological, organizational, and geographic boundaries. In today's complex and fast-evolving digital landscape, interoperability is no longer just a technical concern—it is a strategic enabler. The I-ESA conference addresses a broad range of emerging and mission-critical themes, including: • Digital Sovereignty and Data Governance, ensuring organizations maintain control over their digital assets while engaging in global ecosystems • Resilient and Sustainable Enterprise Architectures, enabling businesses to adapt to uncertainty while supporting environmental and economic sustainability • Interoperability in Decentralised and Distributed Systems, such as blockchain, multi-agent systems, and edge computing • AI-Driven Interoperability and Automation, using artificial intelligence to enhance seamless collaboration between systems and organizations • Human-Centric Interoperability, where people remain at the center of decision-making and system interaction • Standardisation and Compliance in Interoperability, promoting global consistency, interoperability-by-design, and regulatory alignment • Interoperability in Emerging Technologies, exploring integration across technologies like quantum computing, IoT, and digital twins • AI and Learning Systems for Sovereign and Adaptive Interoperability, enabling smart, self-configuring enterprise systems • Cybersecurity and Trust in Interoperable Ecosystems, ensuring secure and reliable collaboration across shared infrastructures • Interoperability for Sustainable Manufacturing and Green Ecosystems, accelerating the shift to low-carbon, circular production models • AI-Powered Green Energy Systems, enabling intelligent, interoperable, and sustainable energy solutions

	• Interoperability for Defense, Security, and Strategic Autonomy, supporting sovereignty in critical national and industrial infrastructures
Information about dissemination activity	
Presentation title	A Data-Driven Architecture for an Electric Arc Furnace: Interoperable ROM-Based Simulation for Steelmaking
Presenter	Michel El Haddad (UNICL)
Other partners involved	UNIGE (Subcontractor of SIM4FUTURE)
Hashtag(s) for Social Media	#Simulation #Modeling #DigitalTwin #IoT
Attachments (e.g. agenda, invitation)	Program overview and detail of the session where the paper has been presented.



13th April | 14th April | 15th April | 16th April

08:30	Opening of Registration Desk			
09:00	Opening and Welcome *Sunrise Auditorium*	Ricardo Gonçalves *Director, UNINOVA-CTS | Full Professor, NOVA FCT*		
09:15	Keynote Talk *Sunrise Auditorium*	Elsa Fernandes *Regional Secretary for Education, Science and Technology*		
09:30	Keynote Talk *Sunrise Auditorium*	Graham Wilkie *Head of Department, Marie Skłodowska-Curie Actions, European Research Executive Agency*		
10:00	Keynote Talk *Sunrise Auditorium*	Anna Puig Centelles *Health and Digital Executive Agency (HaDEA) - European Commission*		
10:30	Coffee Break			
11:00	Regular Session I *Sunset I* *Paper session*	Skills and Education in the Digital Age: Harnessing Data and AI for People *Lagoon I*	AI-Driven Energy Systems in Action: Scaling Impact, Integration, and Strategic Innovation - I *Lagoon II*	Toward Trusted, Interoperable and AI-Enabled Enterprise Knowledge Services *Lagoon III* *Paper session*
12:30	Lunch Break			
14:00	Keynote Talk *Sunrise Auditorium*	Thomas Knothe *Head of the Business Process and Factory Management department at Fraunhofer IPK*		
14:30	Panel: Accountability and Oversight in AI-Enabled Systems *Sunrise Auditorium* *Moderator:* Aleksandar Zobec *Innovation and Project Manager at F6S*	Andreia Rosa Collard *Director of Competitivity, Innovation and Sustainability, Government of Madeira* Hugo Dória *Neuroradiologist at SESARAM* Luigi Gallo *Full Professor of Information Processing Systems at Pegaso University* Ricardo Gonçalves *Director, UNINOVA-CTS | Full Professor, NOVA FCT* Thomas Knothe *Head of the Business Process and Factory Management department at Fraunhofer IPK*		
15:00	Scaling agri-transformation through integrated AI and edge intelligence *Sunset I*	Regular Session II *Lagoon I* *Paper session*	AI-Driven Energy Systems in Action: Scaling Impact, Integration, and Strategic Innovation - II *Lagoon II*	Interoperable Manufacturing-as-a-Service Ecosystems - I *Lagoon III* *Paper session*
16:20	Coffee Break			
16:40	Regular Session III *Sunset I* *Paper session*	Human-Centric AI for European Innovation: Ethics, Resilience and Real-World Impact *Lagoon I*	AI-Driven Energy Systems in Action: Scaling Impact, Integration, and Strategic Innovation - III *Lagoon II*	Interoperable Manufacturing-as-a-Service Ecosystems - II *Lagoon III* *Paper session*
18:00	End of the Day			
19:30	Typical Dinner			

Regular Session II

Tuesday, 14 April, 15h - Lagoon I

Chairs

- Moritz von Stietencron, BIBA
- Cristiano Faveri, NOVA FCT

Papers

- ID 9: Simon Wilbers, Ron van de Sand, Bastian Prell, Jörg Reiff-Stephan; *An Agentic Recommender System Architecture for Interoperable Enterprise Knowledge Management*
- ID 17: Miguel Casali, Andres Boza, Francisco Fraile, Raul Poler; *LLM-Based Agents and Digital Twins: Patterns, Interoperability Challenges, and Multi-Organisational Collaboration*
- ID 21: Atheer Alshaggah, Allal Chafi, Jalal Possik, Laurent Peyrodie; *An Interoperable Digital Twin Framework for Managing Indoor Air Quality Variables: A Case Study in University Classrooms*
- ID 23: Abdelhadi Belfadel, Thomas Hassan, Achraf Kallel; *A Semantic Approach for Digital Twin Cross-Platform Interoperability: Challenges and Resolutions in AAS Data Integration*
- ID 24: Michel El Haddad, Jalal Possik, Marco Gotelli, Charles Yaacoub; *A Data-Driven Architecture for an Electric Arc Furnace: Interoperable ROM-Based Simulation for Steelmaking*

6.7 AISTECH 2026

Event information	
Event name (and acronym)	Annual Iron and Steel technology Conference and Exposition AISTech 2026
Type of event	Conference and Exhibition
Date	May 4-7, 2026
Location	Pittsburgh, PA, USA
Geographic coverage	World
Type of audience	Steel Companies, OEMs, RTOs, Academia.
Approximate size of audience	≈9600
Short description	AISTech is one of the major conferences worldwide in the steel field, covering all aspects of iron and steel production and manufacturing as well as auxiliary processes. It includes more than 100 technical sessions treating significant research developments covering all the technologies involved in ironmaking and steelmaking. The conference program is developed by technology committee members representing iron and steel producers, their allied suppliers and related academia. The technology committees focus on ironmaking, steelmaking, finishing processes, and various engineering and equipment technologies.
Information about dissemination activity	
Presentation title	A Remote Expert Virtual System for Enhanced Situation Awareness and Process Optimization in Electric Arc Furnace Operations
Presenter	Giovanni Bavestrelli (Tenova)
Other partners involved	
Hashtag(s) for Social Media	#iSteel-Expert
Attachments (e.g. agenda, invitation)	Detailed program available online

6.8 ANNMSIM 2026

Event information	
Event name (and acronym)	Annual Modeling and Simulation Conference (ANNSIM 2026)
Type of event	Conference (Scientific Event)
Date	May 4-7, 2026
Location	Orlando, Florida, USA
Geographic coverage	Europe, America
Type of audience	Modelling and Simulation experts, PhD students, Industry
Approximate size of audience	≈170 persons.
Short description	Hosted by The Society for Modeling and Simulation International (SCS), the Annual Modeling and Simulation Conference covers state-of-the-art developments in Modeling & Simulation (M&S). The conference includes keynote speeches presented by technology and industry leaders, technical sessions, and tutorials for professional development. Scientists, engineers, managers, educators, and business professionals who develop or use M&S methodologies and tools are invited to participate and present original contributions. ANNSIM 2025 invited original contributions to the theory, methodology, and practice of modelling and simulation in any discipline.
Information about dissemination activity	
Presentation title	A Data-Driven Digital Twin Architecture for an Electric Arc Furnace Using LSTM-Based Reduced-Order Model and Distributed Simulation
Presenter	Michel El Haddad (UNICL)
Other partners involved	
Hashtag(s) for Social Media	#Simulation #Modeling #DigitalTwin #IoT
Attachments (e.g. agenda, invitation)	Not available

6.8 EEC 2026

Event information	
Event name (and acronym)	14th European Electric Steelmaking Conference (EEC 2026)
Type of event	Conference (Scientific Event)
Date	May 11-13, 2026
Location	Milano, Italy
Geographic coverage	Europe
Type of audience	Steel Industry, RTOs and Academia representatives working in the steel sector
Approximate size of audience	441 persons.
Short description	The conference covered a wide range of topics related to EAF-based steel production and other electric-based processes. Steel manufacturers and producers, Equipment suppliers and technology providers, Researchers and academics, Policy makers and regulators, Environmental consultants, Industry analysts and investors could meet and share knowledge and best practices, identify new research areas and collaboration opportunities, develop strategies to address industry challenges and promote sustainable and efficient electric steelmaking practices. EEC2026 was held in conjunction with the *5th International Conference on Energy and Material Efficiency and CO_2 Reduction in the Steel Industry – EMECR*, a recognized forum for high-level discussions on environmental related topics such as CO_2 reduction, materials efficiency and product life cycles in steel industry worldwide.
Information about dissemination activity	
Presentation title	• Improving Safety in Steelmaking Operations through Advanced Computer Vision and Machine Learning within the iSteel-Expert project • Development of an Intelligent Monitoring System for Anomaly Detection in Electric Arc Furnace Steelmaking • Simulation Based Training for Industrial Operations: Interactive Learning for Complex Tasks • A Cognitive and AI-Based Training Framework for Electric Arc Furnace Workforce Development
Presenter	• Giovanni Bavestrelli (Tenova) • Valentina Colla (SSSA) • Kirill Sinelshchikov (Sim4Future) • Emilio Jiménez (UNIRIO)
Other partners involved	Siderpotenza
Hashtag(s) for Social Media	#steel #metallurgy #RFCS #research #project #dissemination #ArtificialIntelligence #Safety #EAF #Digitalization #TwinTransition
Attachments (e.g. agenda, invitation)	Program of the event

Program

11–13 mag 2026

EEC 2026 – 14th European Electric Steelmaking Conference & EMECR 2026 - 5th International Conference on Energy and Material Efficiency and CO2 Reduction in the Steel Industry

Milan, Milan Marriott Hotel
Via Giorgio Washington 66 | 20146 Milano (MI) Italy

Indice

lun 11 maggio

08:15 – 09:00 **Registration of the attendees**
Pausa | Sede: Milan, Milan Marriott Hotel, Via Giorgio Washington 66 | 20146 Milano (MI) Italy

09:00 – 10:40 **Opening session**
Sessione | Sede: Washington room (ground floor) | Conveners: Carlo Mapelli, Bernd Kleimt

09:00–10:00 **Welcome speeches by the Conference chairpersons**

10:00–10:40 **The Future of the Electric Arc Furnace**
Relatore
Klaus Krüger

10:40 – 11:10 **Coffee break**
Pausa | Sede: Milan, Milan Marriott Hotel, Via Giorgio Washington 66 | 20146 Milano (MI) Italy

11:10 – **Industrial Symbiosis for the steel sector: opportunities, challenges and success stories**
Sessione | Sede: Foscolo room | Convener: Valentina Colla

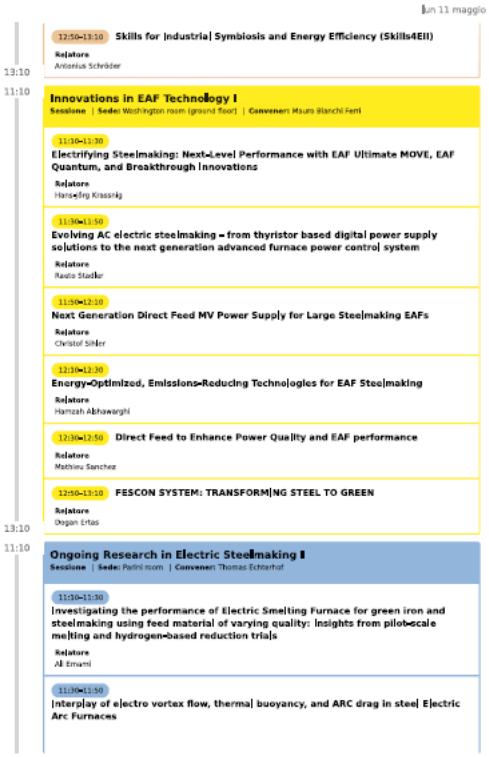
11:10–11:30 **Self-heating risks in metallurgical biochar**
Relatore
Tova Jamerud Örell

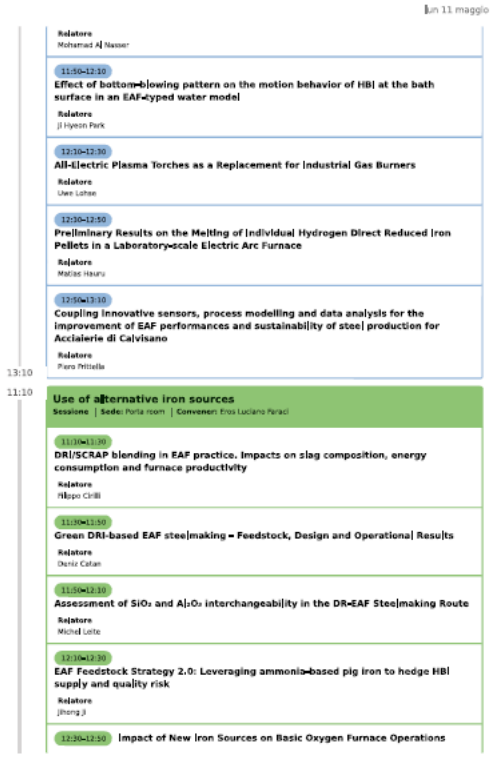
11:30–11:50 **Targeting and supporting Industrial Symbiosis in the steel industry through the Symbio-Steel project**
Relatore
Alice Petrucciani

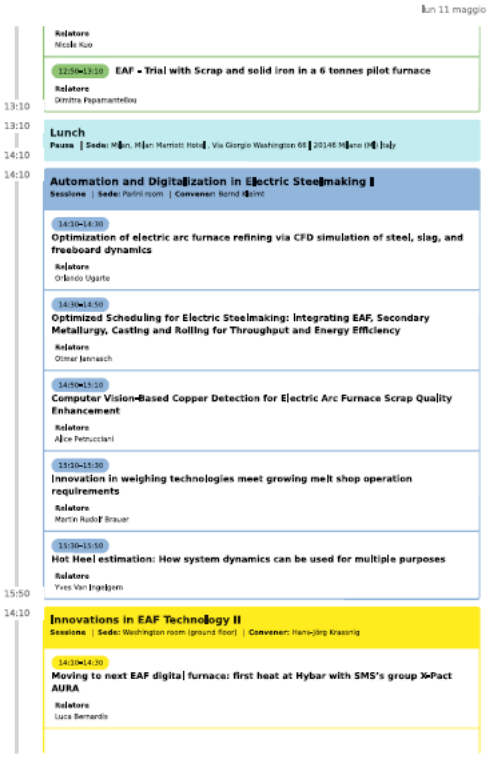
11:50–12:10 **Pilot-Scale Evaluation of Hydrochar Utilization in Electric Arc Furnace Steelmaking: Results from the BioReSteel Project**
Relatore
Chuan Wang

12:10–12:30 **Metallurgical biocarbon as a decarbonization strategy: Policy drivers and industrial implications from a Swedish perspective**
Relatore
William Di Francesco

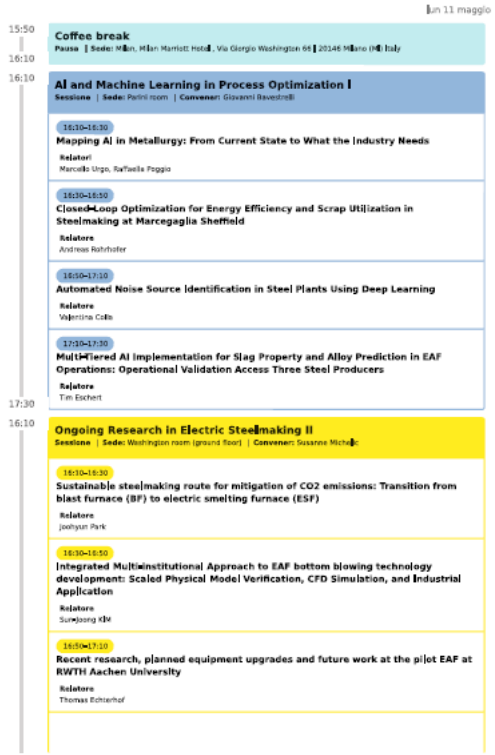
12:30–12:50 **Use of alternative carbon bearing materials in electric arc furnace: potential for multiple industrial symbiosis and process integration solutions**
Relatore
Ismael Matino


lun 11 maggio
12:50–13:10 Skills for Industrial Symbiosis and Energy Efficiency (Skills4EII)
Relatore
Antonius Schröder
13:10
11:10
Innovations in EAF Technology I
Sessione | Sede: Washington room (ground floor) | Convener: Mauro Bianchi Ferri
11:10–11:30
Electrifying Steelmaking: Next-Level Performance with EAF Ultimate MOVE, EAF Quantum, and Breakthrough Innovations
Relatore
Hans-Jörg Krassnig
11:30–11:50
Evolving AC electric steelmaking – from thyristor based digital power supply solutions to the next generation advanced furnace power control system
Relatore
Paolo Stadler
11:50–12:10
Next Generation Direct Feed MV Power Supply for Large Steelmaking EAFs
Relatore
Christof Sihler
12:10–12:30
Energy-Optimized, Emissions-Reducing Technologies for EAF Steelmaking
Relatore
Hamzah Alshawaqfi
12:30–12:50
Direct Feed to Enhance Power Quality and EAF performance
Relatore
Mathieu Sanchez
12:50–13:10
FESCON SYSTEM: TRANSFORMING STEEL TO GREEN
Relatore
Dogan Ertas
13:10
11:10
Ongoing Research in Electric Steelmaking I
Sessione | Sede: Parini room | Convener: Thomas Echterhof
11:10–11:30
Investigating the performance of Electric Smelting Furnace for green iron and steelmaking using feed material of varying quality: Insights from pilot-scale melting and hydrogen-based reduction trials
Relatore
Ali Emami
11:30–11:50
Interplay of electro vortex flow, thermal buoyancy, and ARC drag in steel Electric Arc Furnaces
2

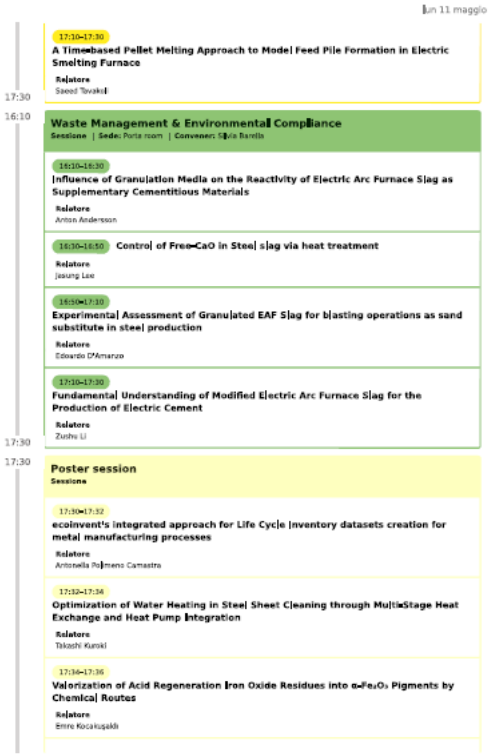

lun 11 maggio
Relatore
Mohamad Al Nasser
11:50–12:10
Effect of bottom-blowing pattern on the motion behavior of HBI at the bath surface in an EAF-typed water model
Relatore
Ji Hyeon Park
12:10–12:30
All-Electric Plasma Torches as a Replacement for Industrial Gas Burners
Relatore
Uwe Lohse
12:30–12:50
Preliminary Results on the Melting of Individual Hydrogen Direct Reduced Iron Pellets in a Laboratory-scale Electric Arc Furnace
Relatore
Matias Hauru
12:50–13:10
Coupling innovative sensors, process modelling and data analysis for the improvement of EAF performances and sustainability of steel production for Acciaierie di Calvisano
Relatore
Piero Pittiella
13:10
11:10
Use of alternative iron sources
Sessione | Sede: Porta room | Convener: Eros Luciano Paraci
11:10–11:30
DRI/SCRAP blending in EAF practice. Impacts on slag composition, energy consumption and furnace productivity
Relatore
Filippo Cirilli
11:30–11:50
Green DRI-based EAF steelmaking – Feedstock, Design and Operational Results
Relatore
Deniz Catan
11:50–12:10
Assessment of SiO_2 and Al_2O_3 interchangeability in the DR-EAF Steelmaking Route
Relatore
Michel Leite
12:10–12:30
EAF Feedstock Strategy 2.0: Leveraging ammonia-based pig iron to hedge HBI supply and quality risk
Relatore
Jihong Ji
12:30–12:50
Impact of New Iron Sources on Basic Oxygen Furnace Operations
3


lun 11 maggio
Relatore
Nicola Kuo
12:50–13:10
EAF – Trial with Scrap and solid iron in a 6 tonnes pilot furnace
Relatore
Dimitra Papamantellou
13:10
13:10
Lunch
Pausa | Sede: Milan, Milan Marriott Hotel, Via Giorgio Washington 68 | 20146 Milano (MI) | Italy
14:10
14:10
Automation and Digitalization in Electric Steelmaking I
Sessione | Sede: Parini room | Convener: Bernd Kleimt
14:10–14:30
Optimization of electric arc furnace refining via CFD simulation of steel, slag, and freeboard dynamics
Relatore
Orlando Ugarte
14:30–14:50
Optimized Scheduling for Electric Steelmaking: Integrating EAF, Secondary Metallurgy, Casting and Rolling for Throughput and Energy Efficiency
Relatore
Otmar Jennach
14:50–15:10
Computer Vision-Based Copper Detection for Electric Arc Furnace Scrap Quality Enhancement
Relatore
Alice Petrucciani
15:10–15:30
Innovation in weighing technologies meet growing melt shop operation requirements
Relatore
Martin Rudolf Brauer
15:30–15:50
Hot Heel estimation: How system dynamics can be used for multiple purposes
Relatore
Yves Van Ingelgem
15:50
14:10
Innovations in EAF Technology II
Sessione | Sede: Washington room (ground floor) | Convener: Hans-Jörg Krassnig
14:10–14:30
Moving to next EAF digital furnace: first heat at Hybar with SMS's group X-Pact AURA
Relatore
Luca Bernardis
4

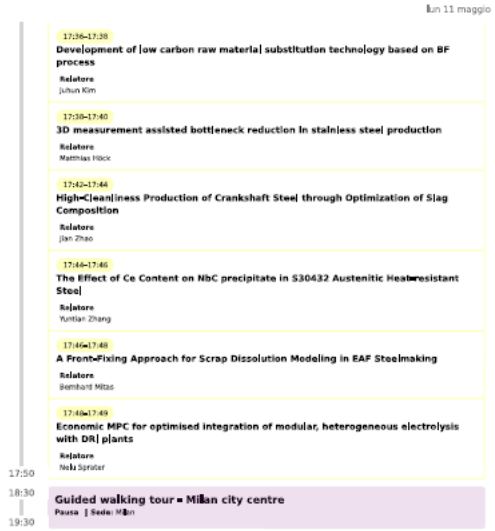

lun 11 maggio
14:30–14:50
BSE-EAF – Future-proof Melting, Automated System for safe, reliable & efficient operation
Relatore
Jens Apfel
14:50–15:10
Sulphur control as part of steelmaking transition, Challenge or opportunity
Relatore
Bojan Vucinic
15:10–15:30
Digital Regulator-Based Control Strategies for Electric Arc Furnace
Relatore
Michel Wurlitzer
15:30–15:50
Application of Modular Multilevel Converters in Electric Arc Furnace Systems
Relatore
Paul Kusmierek
15:50
14:10
Scrap management and quality improvement
Sessione | Sede: Porta room | Convener: Silvia Barella
14:10–14:30
Image-Based Steel Scrap Mixture Recognition Using Deep Neural Networks
Relatore
Giovanni Misso
14:30–14:50
Next Generation Raw-Material and Process Optimization in Electric Arc Furnace Steelmaking
Relatore
Maximilian Kern
14:50–15:10
Conclusions of CAESAR HEU project – CircularArity Enhancements by low quality Scrap Analysis and Refinement
Relatore
Jean-Christophe Pierret
15:10–15:30
Engineering Rapid Automotive Materials Sustainability (e-RAMS): Upstream conditioning of ELV scrap for high-quality EAF steelmaking
Relatore
Masoud Ahmadinia
15:30–15:50
Process Intensification of EAF-A New Perspective with Plasma
Relatore
Haijuan Wang
15:50
5


lun 11 maggio
15:50
Coffee break
Pausa | Sede: Milan, Milan Marriott Hotel, Via Giorgio Washington 66 | 20146 Milano (MI) Italy
16:10
AI and Machine Learning in Process Optimization I
Sessione | Sede: Parini room | Convener: Giovanni Ravestrelli
16:10–16:30
Mapping AI in Metallurgy: From Current State to What the Industry Needs
Relatori
Marcello Urgo, Raffaella Poggio
16:30–16:50
Closed-Loop Optimization for Energy Efficiency and Scrap Utilization in Steelmaking at Marcegaglia Sheffield
Relatore
Andreas Rohrhofer
16:50–17:10
Automated Noise Source Identification in Steel Plants Using Deep Learning
Relatore
Valentina Colla
17:10–17:30
Multi-Tiered AI Implementation for Slag Property and Alloy Prediction in EAF Operations: Operational Validation Access Three Steel Producers
Relatore
Tim Eschert
17:30
16:10
Ongoing Research in Electric Steelmaking II
Sessione | Sede: Washington room (ground floor) | Convener: Susanne Michelic
16:10–16:30
Sustainable steelmaking route for mitigation of CO2 emissions: Transition from blast furnace (BF) to electric smelting furnace (ESF)
Relatore
Joohyun Park
16:30–16:50
Integrated Multi-institutional Approach to EAF bottom blowing technology development: Scaled Physical Model Verification, CFD Simulation, and Industrial Application
Relatore
Sun-Joong Kim
16:50–17:10
Recent research, planned equipment upgrades and future work at the pilot EAF at RWTH Aachen University
Relatore
Thomas Echterhof

6


lun 11 maggio
17:10–17:30
A Time-based Pellet Melting Approach to Model Feed Pile Formation in Electric Smelting Furnace
Relatore
Saeed Tavakol
17:30
16:10
Waste Management & Environmental Compliance
Sessione | Sede: Porta room | Convener: Silvia Barella
16:10–16:30
Influence of Granulation Media on the Reactivity of Electric Arc Furnace Slag as Supplementary Cementitious Materials
Relatore
Anton Andersson
16:30–16:50
Control of Free-CaO in Steel slag via heat treatment
Relatore
Jaeung Lee
16:50–17:10
Experimental Assessment of Granulated EAF Slag for blasting operations as sand substitute in steel production
Relatore
Edoardo D'Amarzo
17:10–17:30
Fundamental Understanding of Modified Electric Arc Furnace Slag for the Production of Electric Cement
Relatore
Zushu Li
17:30
17:30
Poster session
Sessione
17:30–17:32
ecoinvent's integrated approach for Life Cycle Inventory datasets creation for metal manufacturing processes
Relatore
Antonella Polimeno Camastra
17:32–17:34
Optimization of Water Heating in Steel Sheet Cleaning through Multi-Stage Heat Exchange and Heat Pump Integration
Relatore
Takashi Kuroki
17:36–17:36
Valorization of Acid Regeneration Iron Oxide Residues into α-Fe₂O₃ Pigments by Chemical Routes
Relatore
Emre Kocakuşaklı

7

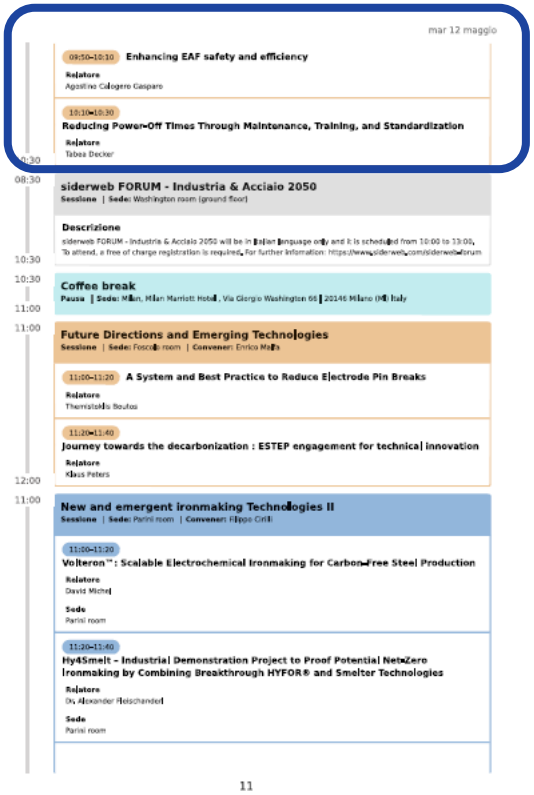

lun 11 maggio
17:36–17:38
Development of low carbon raw material substitution technology based on BF process
Relatore
Juhun Kim
17:38–17:40
3D measurement assisted bottleneck reduction in stainless steel production
Relatore
Matthias Höck
17:42–17:44
High-Cleanliness Production of Crankshaft Steel through Optimization of Slag Composition
Relatore
Jian Zhao
17:46–17:46
The Effect of Ce Content on NbC precipitate in S30432 Austenitic Heat-resistant Steel
Relatore
Yunlan Zhang
17:46–17:48
A Front-Fixing Approach for Scrap Dissolution Modeling in EAF Steelmaking
Relatore
Bernhard Mitas
17:48–17:49
Economic MPC for optimised integration of modular, heterogeneous electrolysis with DRI plants
Relatore
Nelu Spinter
17:50
18:30
Guided walking tour - Milan city centre
Pausa | Sede: Milan
19:30

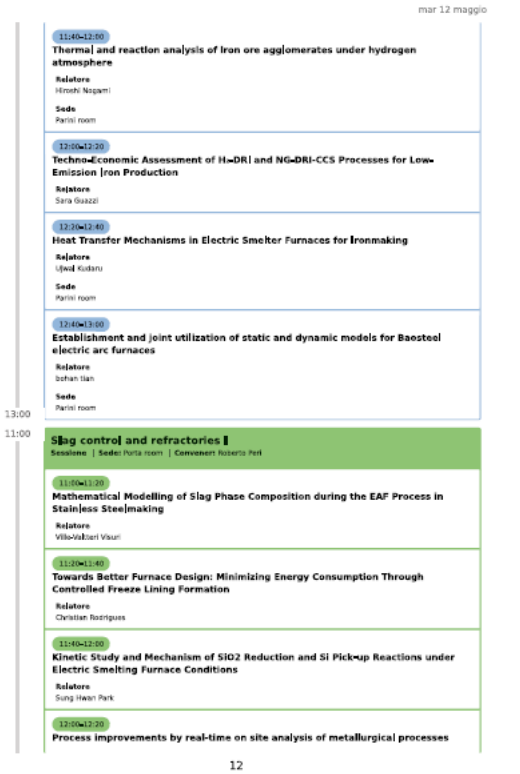
8

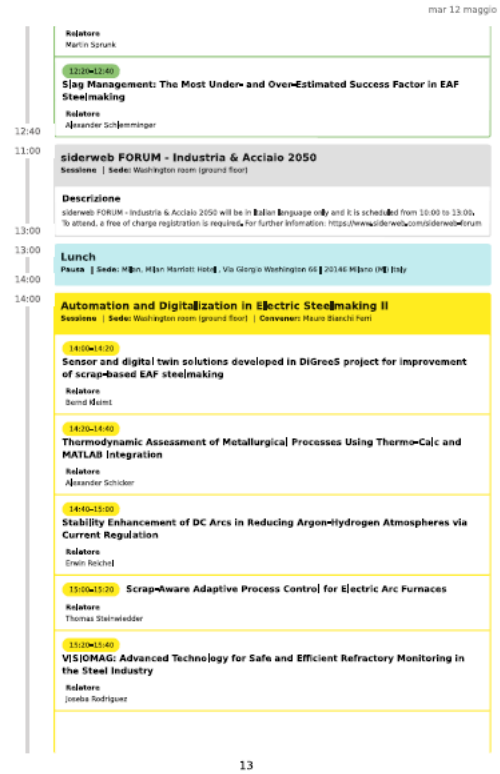

mar 12 maggio
mar 12 maggio
08:30
New and emergent ironmaking Technologies I
Sessione | Sede: Parini room | Convener: Peter Kinzel
08:30–08:50
Hisarna - smelting reduction for a carbon neutral steel industry
Relatore
Koen Meijer
08:50–09:10
Mitigation of COS_2$ Emissions from Blast Furnaces through Injection of Carbon-Recycled Reducing Agents with High Heat Supply via Partial Combustion
Relatore
Seiji Uchida
09:10–09:30
Development of low carbon sinter technology using low melting point additives
Relatore
Byung Jun Chung
09:30–09:50
Assessment of Oxide Alloying Elements in the Hydrogen Plasma Smelting Reduction (HPSR) Process
Relatore
Daniel Ernst
09:50–10:10
Thermodynamics and Kinetic Modelling of Flash Reduction Ironmaking
Relatore
Shabnam Sabah
10:10–10:30
Biochar application for sustainable ironmaking using electric smelting furnace
Relatore
Hannah Hyunah Cho
10:30
08:30
Process Control and Quality Improvement
Sessione | Sede: Porta room | Convener: Davide Mombelli
08:30–08:50
Effect of Bottom-Blowing on Nitrogen Removal Kinetics in Electric Arc Furnace (EAF) Conditions
Relatore
GeunWoo Byun
08:50–09:30
Implementation of Novel Tracing Techniques to Control Steel Cleanness in CO2-Neutral Steelmaking

9


mar 12 maggio
Relatore
Kathrin Thiele
08:10–08:30
Dynamic Modeling and Optimization of Electric Arc Furnace Operation: Coupling Energy, Oxygen, and Slag Chemistry
Relatore
Ankur Agnihotri
08:30–08:50
Temperature-Dependent Carburization Kinetics and Carbon deposition of iron in CO-H2-CH4 Gas Mixtures
Relatore
Dahan Jo
08:50–09:10
Monitoring the Ar-plasma pre-melting of fluxed Cr2O3 and iron oxides in a lab-scale electric arc furnace
Relatore
Yuhan Sun
09:30–09:50
Influence of copper and tin on the oxidic cleanness and investigation of the agglomeration tendency of nonmetallic inclusions in a medium-carbon steel
Relatore
Lukas Ceike
10:30
Safety and Training
Sessione | Sede: Foscolo room | Convener: Enrico Malfa
08:30–08:50
Improving Safety in Steelmaking Operations through Advanced Computer Vision and Machine Learning within the ISteel-Expert Project
Relatore
Giovanni Bavestrelli
08:50–09:10
Development of Intelligent Monitoring Systems for Anomaly Detection in Electric Arc Furnace Steelmaking
Relatore
Valentina Colla
09:10–09:30
Simulation Based Training for Industrial Operations: Interactive Learning for Complex Tasks
Relatore
Kiril Sinelshchikov
09:30–09:50
A Cognitive and AI-Based Training Framework for Electric Arc Furnace Workforce Development
Relatore
Emilio Jimenez
10


mar 12 maggio
09:50–10:10
Enhancing EAF safety and efficiency
Relatore
Agostino Calogero Gaspare
10:10–10:30
Reducing Power-Off Times Through Maintenance, Training, and Standardization
Relatore
Tabea Decker
10:30
08:30
siderweb FORUM - Industria & Acciaio 2050
Sessione | Sede: Washington room (ground floor)
Descrizione
siderweb FORUM - Industria & Acciaio 2050 will be in Italian language only and it is scheduled from 10:00 to 13:00.
To attend, a free of charge registration is required. For further information: https://www.siderweb.com/siderwebforum
10:30
10:30
Coffee break
Pausa | Sede: Milan, Milan Marriott Hotel, Via Giorgio Washington 66 | 20146 Milano (MI) Italy
11:00
11:00
Future Directions and Emerging Technologies
Sessione | Sede: Foscolo room | Convener: Enrico Malfa
11:00–11:20
A System and Best Practice to Reduce Electrode Pin Breaks
Relatore
Themistoklis Boutos
11:20–11:40
Journey towards the decarbonization : ESTEP engagement for technical innovation
Relatore
Klaus Peters
12:00
11:00
New and emergent ironmaking Technologies II
Sessione | Sede: Parini room | Convener: Filippo Cirilli
11:00–11:20
Volteron™: Scalable Electrochemical Ironmaking for Carbon-Free Steel Production
Relatore
David Michel
Sede
Parini room
11:20–11:40
Hy4Smelt – Industrial Demonstration Project to Proof Potential NetxZero Ironmaking by Combining Breakthrough HYFOR® and Smelter Technologies
Relatore
Dr. Alexander Fleischanderl
Sede
Parini room
11


mar 12 maggio
11:40–12:00
Thermal and reaction analysis of iron ore agglomerates under hydrogen atmosphere
Relatore
Hiroshi Nogami
Sede
Parini room
12:00–12:20
Techno-Economic Assessment of H2-DRI and NG-DRI-CCS Processes for Low-Emission Iron Production
Relatore
Sara Guazzi
12:20–12:40
Heat Transfer Mechanisms in Electric Smelter Furnaces for Ironmaking
Relatore
Ujwal Kudaru
Sede
Parini room
12:40–13:00
Establishment and joint utilization of static and dynamic models for Baosteel electric arc furnaces
Relatore
Bohan Han
Sede
Parini room
13:00
11:00
Slag control and refractories I
Sessione | Sede: Porta room | Convener: Roberto Peri
11:00–11:20
Mathematical Modelling of Slag Phase Composition during the EAF Process in Stainless Steelmaking
Relatore
Villo-Valtteri Visuri
11:20–11:40
Towards Better Furnace Design: Minimizing Energy Consumption Through Controlled Freeze Lining Formation
Relatore
Christian Rodrigues
11:40–12:00
Kinetic Study and Mechanism of SiO2 Reduction and Si Pick-up Reactions under Electric Smelting Furnace Conditions
Relatore
Sung Hwan Park
12:00–12:20
Process improvements by real-time on site analysis of metallurgical processes
12


mar 12 maggio
Relatore
Martin Sprunk
12:20–12:40
Slag Management: The Most Under- and Over-Estimated Success Factor in EAF Steelmaking
Relatore
Alexander Schlemminger
12:40
11:00
siderweb FORUM - Industria & Acciaio 2050
Sessione | Sede: Washington room (ground floor)
Descrizione
siderweb FORUM - Industria & Acciaio 2050 will be in Italian language only and it is scheduled from 10:00 to 13:00.
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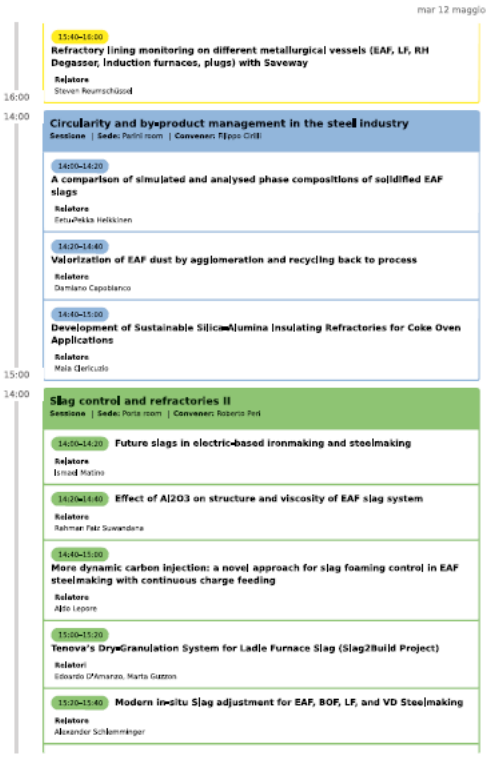
13:00
13:00
Lunch
Pausa | Sede: Milan, Milan Marriott Hotel, Via Giorgio Washington 66 | 20146 Milano (MI) Italy
14:00
14:00
Automation and Digitalization in Electric Steelmaking II
Sessione | Sede: Washington room (ground floor) | Convener: Mauro Bianchi Ferri
14:00–14:20
Sensor and digital twin solutions developed in DiGreeS project for improvement of scrap-based EAF steelmaking
Relatore
Bernd Hüttl
14:20–14:40
Thermodynamic Assessment of Metallurgical Processes Using Thermo-Calc and MATLAB Integration
Relatore
Alexander Schicker
14:40–15:00
Stability Enhancement of DC Arcs in Reducing Argon-Hydrogen Atmospheres via Current Regulation
Relatore
Erwin Reichel
15:00–15:20
Scrap-Aware Adaptive Process Control for Electric Arc Furnaces
Relatore
Thomas Steinwiedder
15:20–15:40
VISIOMAG: Advanced Technology for Safe and Efficient Refractory Monitoring in the Steel Industry
Relatore
Joseba Rodriguez
13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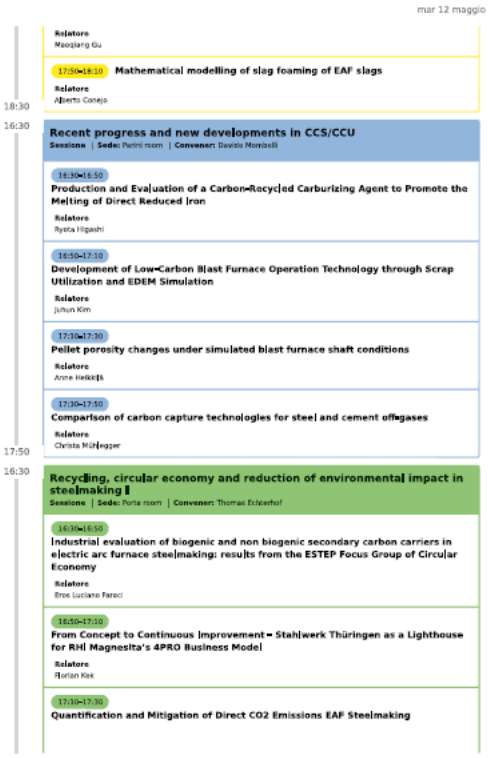
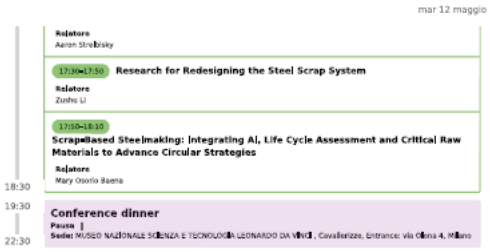
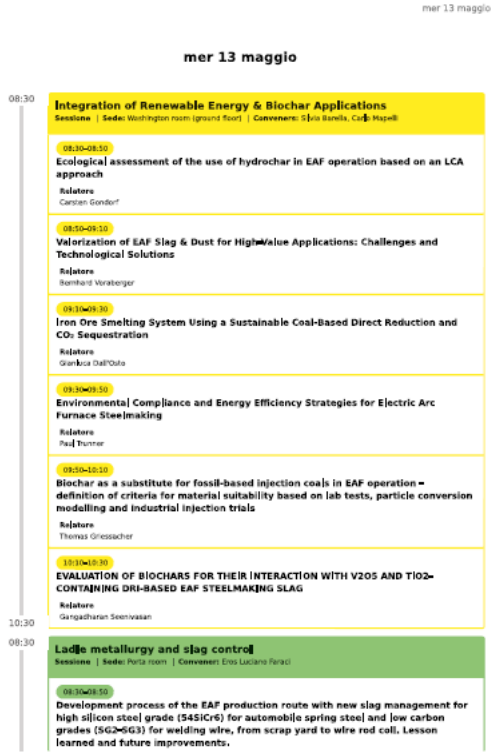
15:40–16:00
Refractory lining monitoring on different metallurgical vessels (EAF, LF, RH Degasser, Induction furnaces, plugs) with Saveway
Relatore
Steven Reumschüssel
16:00
14:00
Circularity and by-product management in the steel industry
Sessione | Sede: Parini room | Convener: Filippo Cirilli
14:00–14:20
A comparison of simulated and analysed phase compositions of solidified EAF slags
Relatore
Eetu-Pekka Heikkinen
14:20–14:40
Valorization of EAF dust by agglomeration and recycling back to process
Relatore
Damiano Capobianco
14:40–15:00
Development of Sustainable Silica-Alumina Insulating Refractories for Coke Oven Applications
Relatore
Maia Clericulio
15:00
14:00
Slag control and refractories II
Sessione | Sede: Porta room | Convener: Roberta Peri
14:00–14:20
Future slags in electric-based ironmaking and steelmaking
Relatore
Ismael Matino
14:20–14:40
Effect of Al2O3 on structure and viscosity of EAF slag system
Relatore
Rahmat Fajr Suwandana
14:40–15:00
More dynamic carbon injection: a novel approach for slag foaming control in EAF steelmaking with continuous charge feeding
Relatore
Aldo Lepore
15:00–15:20
Tenova's Dry-Granulation System for Ladle Furnace Slag (Slag2Build Project)
Relatori
Edoardo D'Amarzo, Marta Gazzon
15:20–15:40
Modern in-situ Slag adjustment for EAF, BOF, LF, and VD Steelmaking
Relatore
Alexander Schlemminger
14


mar 12 maggio
15:40–16:00
Implementation of recycled Zirconia in slag band layer of submerged entry nozzle
Relatore
Suresh Kodukula
16:00
15:00
Renewable gases and CO2 mitigation in steel industry I
Sessione | Sede: Parini room | Convener: Filippo Cirilli
15:00–15:20
Circular Carbon and Electrified Heat: Carbon neutral Syngas heated by Paul Wurth Tempra to reduce Blast Furnace CO2 Emissions
Relatore
Cristiano Castagnola
15:20–15:40
Effect of hydrogen oxyfuel combustion on oxide scale descalability by thermal shock in low-carbon steels
Relatore
Susanna Airaksinen
15:40–16:00
Assessment of Biochar Production and Integration into Hisarna Ironmaking
Relatore
Nirmal Madhavan
16:00
16:00
Coffee break
Pause | Sede: Milan, Milan Marriott Hotel, Via Giorgio Washington 68 | 20146 Milano (MI) Italy
16:30
16:30
AI and Machine Learning in Process Optimization II
Sessione | Sede: Washington room (ground floor) | Convener: Andrea Faraci
16:30–16:50
Machine Learning-based Scrap Characterization for Process Optimization in Electric Arc Furnaces
Relatore
Siddharth Nachankar
16:50–17:10
Physics-Informed Reduced-Order Modeling for Temperature Prediction in Industrial Reheating Furnaces
Relatore
Pratiksha Biswal
17:10–17:30
AI Assisted Thermal Modelling for Advanced Furnace Control and Process Optimization
Relatore
Julian Naveira
17:30–17:30
Temperature prediction model in an electric arc furnace based on data-driven
15


mar 12 maggio
Relatore
Maoqiang Gu
17:30–18:10
Mathematical modelling of slag foaming of EAF slags
Relatore
Alberto Conejo
18:30
16:30
Recent progress and new developments in CCS/CCU
Sessione | Sede: Parini room | Convener: Davide Mombelli
16:30–16:50
Production and Evaluation of a Carbon-Recycled Carburizing Agent to Promote the Melting of Direct Reduced Iron
Relatore
Ryota Higashi
16:50–17:10
Development of Low-Carbon Blast Furnace Operation Technology through Scrap Utilization and EDEM Simulation
Relatore
Juhun Kim
17:10–17:30
Pellet porosity changes under simulated blast furnace shaft conditions
Relatore
Anne Heikkilä
17:30–17:50
Comparison of carbon capture technologies for steel and cement offgases
Relatore
Christa Mühlegger
17:50
16:30
Recycling, circular economy and reduction of environmental impact in steelmaking I
Sessione | Sede: Porta room | Convener: Thomas Echterhof
16:30–16:50
Industrial evaluation of biogenic and non biogenic secondary carbon carriers in electric arc furnace steelmaking: results from the ESTEP Focus Group of Circular Economy
Relatore
Eros Luciano Faraci
16:50–17:10
From Concept to Continuous Improvement – Stahlwerk Thüringen as a Lighthouse for RHI Magnesita's 4PRO Business Model
Relatore
Florian Kiek
17:30–17:30
Quantification and Mitigation of Direct CO2 Emissions EAF Steelmaking
16


mar 12 maggio
Relatore
Aaron Strebisky
17:30–17:50
Research for Redesigning the Steel Scrap System
Relatore
Zunhu Li
17:50–18:10
Scrap-Based Steelmaking: Integrating AI, Life Cycle Assessment and Critical Raw Materials to Advance Circular Strategies
Relatore
Mary Osorio Baena
18:30
19:30
Conference dinner
Pause |
Sede: MUSEO NAZIONALE SCIENZA E TECNOLOGIA LEONARDO DA VINCI, Cavallerizze, Entrance: via Olona 4, Milano
22:30
17


mer 13 maggio

mer 13 maggio

08:30 **Integration of Renewable Energy & Biochar Applications**
Sessione | Sede: Washington room (ground floor) | Convener: Silvia Barella, Carlo Mapelli

08:30–08:50 **Ecological assessment of the use of hydrochar in EAF operation based on an LCA approach**
Relatore
Carsten Gondorf

08:50–09:10 **Valorization of EAF Slag & Dust for High-Value Applications: Challenges and Technological Solutions**
Relatore
Bernhard Voraberger

09:10–09:30 **Iron Ore Smelting System Using a Sustainable Coal-Based Direct Reduction and CO_2 Sequestration**
Relatore
Gianluca Dall'Osto

09:30–09:50 **Environmental Compliance and Energy Efficiency Strategies for Electric Arc Furnace Steelmaking**
Relatore
Paul Trunner

09:50–10:10 **Biochar as a substitute for fossil-based injection coals in EAF operation – definition of criteria for material suitability based on lab tests, particle conversion modelling and industrial injection trials**
Relatore
Thomas Griessacher

10:10–10:30 **EVALUATION OF BIOCHARS FOR THEIR INTERACTION WITH V2O5 AND TiO2-CONTAINING DRI-BASED EAF STEELMAKING SLAG**
Relatore
Gangadharan Seenivasan

10:30

08:30 **Ladle metallurgy and slag control**
Sessione | Sede: Porta room | Convener: Eros Luciano Feraci

08:30–08:50 **Development process of the EAF production route with new slag management for high silicon steel grade (54SiCr6) for automobile spring steel and low carbon grades (SG2-SG3) for welding wire, from scrap yard to wire rod coil. Lesson learned and future improvements.**

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Relatore
Luca Gemo

08:50–09:10 **EAF versus Smelter + BOF – A Comparative Assessment for Low-Carbon Steelmaking**
Relatore
Gerald Wimmer
Sede
Porta room

09:10–09:30 **The Study of Different Ca Cored Wires on Calcium Treatment Process**
Relatore
Memduh Kagan Koler
Sede
Porta room

09:30–09:50 **The Evolution of Tundish Working Lining Mass as the Example of Sustainability and Eco design of refractory masses**
Relatori
Ane Ibáñez, Iñigo Xabier García Zubiri
Sede
Porta room

09:50–10:10 **Assessment of dephosphoration and desulphurizing capacity of the slag as a function of the lime reactivity**
Relatore
Gianluca Dall'Osto
Sede
Porta room

10:10–10:30 **In situ observation of metal-slag separation and inclusion motion at the surface of hydrogen-based direct reduction iron melt**
Relatore
Wangzhong Mu
Sede
Porta room

10:30

08:30 **Successful implementation of electric steelmaking technologies & Best practices**
Sessione | Sede: Parini room | Convener: Marta Guzzon

08:30–08:50 **The Electric Arc Furnace for next gen mini mill**
Relatore
Massimiliano Dalla

08:50–09:10 **Secured EAF performance through process discipline — including constraints of raw material and experience**

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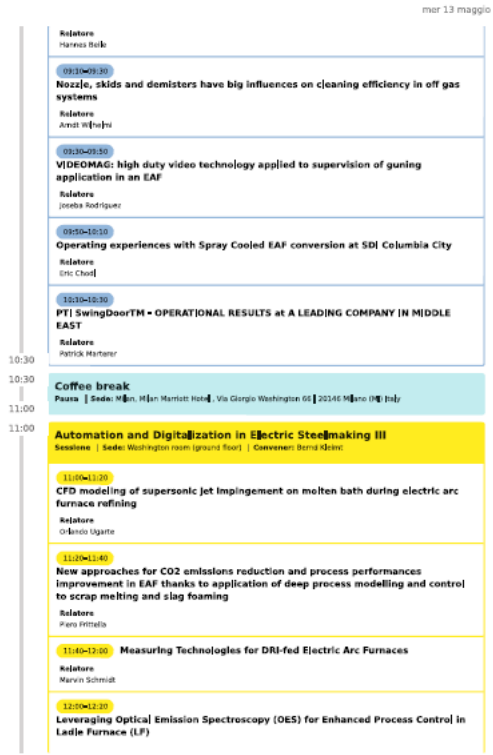
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Relatore
Hannes Belk

09:10–09:30 **Nozzle, skids and demisters have big influences on cleaning efficiency in off gas systems**
Relatore
Arndt Welpi

09:30–09:50 **VIDEOMAG: high duty video technology applied to supervision of guning application in an EAF**
Relatore
Jeeba Rodriguez

09:50–10:10 **Operating experiences with Spray Cooled EAF conversion at SDI Columbia City**
Relatore
Eric Choat

10:10–10:30 **PTI SwingDoorTM – OPERATIONAL RESULTS at A LEADING COMPANY IN MIDDLE EAST**
Relatore
Patrick Martarer

10:30

10:30 **Coffee break**
Pausa | Sede: Milan, Milan Marriott Hotel, Via Giorgio Washington 66 | 20146 Milano (MI) Italy

11:00

11:00 **Automation and Digitalization in Electric Steelmaking III**
Sessione | Sede: Washington room (ground floor) | Convener: Bernd Kleimt

11:00–11:20 **CFD modeling of supersonic jet impingement on molten bath during electric arc furnace refining**
Relatore
Orlando Ugarte

11:20–11:40 **New approaches for CO2 emissions reduction and process performances improvement in EAF thanks to application of deep process modelling and control to scrap melting and slag foaming**
Relatore
Piero Frittella

11:40–12:00 **Measuring Technologies for DRI-fed Electric Arc Furnaces**
Relatore
Marvin Schmidt

12:00–12:20 **Leveraging Optical Emission Spectroscopy (OES) for Enhanced Process Control in Ladle Furnace (LF)**

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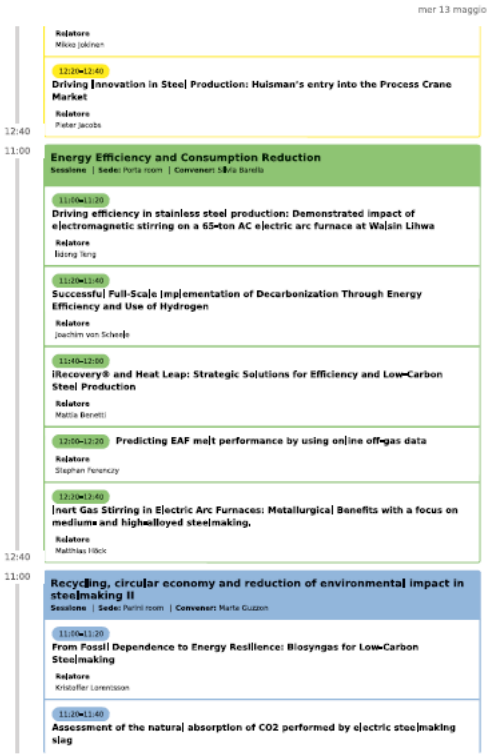
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Relatore
Mikko Jokinen

12:20–12:40 **Driving Innovation in Steel Production: Huisman's entry into the Process Crane Market**
Relatore
Pieter Jacobs

12:40

11:00 **Energy Efficiency and Consumption Reduction**
Sessione | Sede: Porta room | Convener: Silvia Barella

11:00–11:20 **Driving efficiency in stainless steel production: Demonstrated impact of electromagnetic stirring on a 65-ton AC electric arc furnace at Walsin Lihwa**
Relatore
Jidong Teng

11:20–11:40 **Successful Full-Scale Implementation of Decarbonization Through Energy Efficiency and Use of Hydrogen**
Relatore
Joachim von Scheele

11:40–12:00 **iRecovery® and Heat Leap: Strategic Solutions for Efficiency and Low-Carbon Steel Production**
Relatore
Mattia Benetti

12:00–12:20 **Predicting EAF melt performance by using online off-gas data**
Relatore
Stephan Feranczy

12:20–12:40 **Inert Gas Stirring in Electric Arc Furnaces: Metallurgical Benefits with a focus on medium- and high-alloyed steelmaking.**
Relatore
Matthias Höck

12:40

11:00 **Recycling, circular economy and reduction of environmental impact in steelmaking II**
Sessione | Sede: Parini room | Convener: Marta Guzzon

11:00–11:20 **From Fossil Dependence to Energy Resilience: Biosyngas for Low-Carbon Steelmaking**
Relatore
Kristoffer Lorentsson

11:20–11:40 **Assessment of the natural absorption of CO2 performed by electric steelmaking slag**

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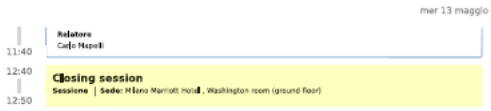
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11:40
Relatore
Carlo Napoli
12:40
12:50
Closing session
Sessalone | Sede: Milano Marriott Hotel, Washington room (ground floor)

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6. Appendix II: English translation of the press release issued on Open Innovation.

Artificial intelligence enters the steelworks: safety and innovation with the iSteel-Expert project

In the heart of modern steelworks, where extreme temperatures and massive machinery coexist with the need to achieve maximum efficiency, worker safety remains a crucial challenge. It is in this context that the iSteel-Expert project is developing an intelligent system with an ambitious goal: to improve process efficiency and drastically reduce risks in electric arc furnace (EAF) plants, thanks to an IT infrastructure powered by artificial intelligence.

A high-risk environment

Electric Arc Furnaces are essential plants for the green transition and for the implementation of circular economy models in steel production, thanks to the efficient recycling of scrap metal, but they operate in extreme conditions: temperatures above 1,600 °C, emissions of harmful fumes and the use of very high power equipment.

Despite advances in training and safety procedures, human error remains a critical factor. Hence the need for automated solutions that can monitor processes and intervene before an anomaly turns into an accident.

Data, sensors and artificial intelligence

The system is based on a network of sensors - cameras, microphones and accelerometers - located at key points of the plant. These devices constantly gather visual, acoustic and vibrational data, which are processed by computer vision algorithms, also based on machine learning tools, such as neural networks, to detect smoke, flames, operational anomalies or the presence of operators in hazardous areas.

With an intuitive end-user interface, the system provides operators with an up-to-date picture and generates alarms when it detects hazardous conditions. All this is done with a processing speed lower than 1 second per image, enough to allow fast reactions.

Promising results

During production, the model proved effective in recognizing potentially hazardous situations (presence of individuals in risk areas), with 96% accuracy and fast response times. Even in detection of smoke and flames, the model achieved a correctness rate of 95%, confirming the robustness of the approach. These findings pave the way for continuous, automated monitoring, reducing the need for direct supervision in high-risk environments.

Towards the steelworks of the future

The iSteel-Expert project represents an important step in the digital transformation of the steel industry. The integration of AI and smart sensors not only increases worker safety but also improves the efficiency and sustainability of production processes.

The next development steps are aimed at refining the algorithms and expanding the system's functions, leading to autonomous monitoring of industrial operations.

Thanks to initiatives such as iSteel-Expert, a project co-funded by the Research Fund for Coal and Steel (RFCS) - Grant Agreement No. 101112102, the European funding program that supports research and demonstration projects in the coal and steel sectors, the factory of the future will not only be more productive, but also safer and smarter - a goal that combines technology, people protection and industrial progress.

The project is carried out by a partnership of 6 subjects: Tenova (leader), a leading company in the development and supply of sustainable solutions for the green transition of the metallurgical industry, with headquarters in Castellanza (VA), Scuola Superiore Sant'Anna; Siderpotenza (Pittini Group); Institut Catholique de Lille; Universidad de la Rioja and SIM4future (spin-off of the University of Genoa).

7. Appendix III: English translation of the press release issued on Twin+.

iSteel-Expert, a digital twin that supports the steel industry

Launched in July 2023 by a consortium in a steel environment, the iSteel-Expert project plans to develop a digital twin that represents and simulates industrial operations, without relying on human expertise. Dedicated to electric arc furnaces, it is dedicated to understanding and interpreting business data to capitalize on it, strengthen internal training, and optimize energy and operational performance.

Supported by a partnership established between six organisations (Tenova, the Institut Catholique de Lille, Scuola Superiore Sant'Anna, Siderpotenza, Universidad de La Rioja and SIM4Future) and co-funded by the Research Fund for Coal and Steel (RFCS - Grant Agreement No 101112102) - a European programme to support research and demonstration in the coal and steel sectors, the iSteel-Expert digital twin aims to support the digital transformation of the steel sector, with an intelligent system that performs the monitoring, control and security of steel mills equipped with electric arc furnaces (EAF). "*It contributes to making the steel plant safer, smarter and more predictable, while training a workforce that is better qualified and equipped with advanced digital skills*," says Jalal Possik, director of the Ecole du Numérique and teacher-researcher at the Catholic University of Lille. It must strengthen security in the fusion zones, assist operators in decision-making, digitize and disseminate business expertise so that it can be transmitted in the long term, and improve energy and operational performance. "*In addition to improving process efficiency and safety, it introduces modern and immersive educational approaches, meeting the challenges of the European steel sector*," adds Isabella Marchese, R&D and innovation project expert at Impresa LAB.

From descriptive digital twin to cognitive digital twin

Bringing together industry and academia, the project is based on a multi-layered digital twin architecture combining field data, artificial intelligence, human expertise and immersive training. It relies on robust sensors (optical and thermal cameras, microphones, acoustic and vibration sensors), installed on site to collect data continuously and analyze it using artificial intelligence and machine learning algorithms. They are used to detect events (smoke emissions, human presence, etc.), operating anomalies, risky or non-compliant situations, etc. *"The digital twin is calibrated to identify and interpret real-life situations, adapting and scaling behaviors through the capitalization of industrial expertise,"* explains Isabella Marchese. The 3D simulation and virtual reality platform supports the development of teams' skills by simulating realistic and complex scenarios. "*This allows, for example, to reproduce emergency situations, human-machine interactions and production flows to train operators safely, sharpen their decision-making skills and expand their understanding of the processes related to electric arc furnaces*," says Jalal Possik.

The iSteel-Expert project is scheduled to be completed by June 30, 2026. On a technical level, its feasibility has been validated. Field validations are currently underway, and the first results appear to be significant. On the operational side, *"the AI-based detection system achieves very high levels of*

accuracy, providing 24/7 automated monitoring. The integration of sensor data can generate structured performance indicators (KPIs), supporting decision-making, rapid interventions and the deployment of more predictive maintenance strategies," says Isabella Marchese. At the same time, in terms of digital architecture and training, *"the implementation of a digital ecosystem of immersive training is progressing, accelerating learning and strengthening the quality of the skills acquired,"* continues Jalal Possik.

Beyond the cognitive dimension, iSteel-Expert is based on the integration and real-time synchronization of several technological components (artificial intelligence, industrial IoT sensors, discrete event simulation, multi-agent simulation and immersive virtual reality environments). The challenge is to make these heterogeneous bricks work, in a coherent way, which operate on different temporal and functional scales; while ensuring a faithful and dynamic representation of industrial operations." Interoperability is made possible through a distributed simulation approach, ensuring data exchange, model coordination, and consideration of interactions between physical, digital, and human systems in an operational setting. Finally, the iSteel-Expert digital twin should be used by furnace operators, safety managers, trainers and remote support services.