



Deliverable 6.7

Report on dissemination activities - second version

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1. Introduction

The iSteel-Expert Consortium is keen to communicate and disseminate 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 second of a set of 3 deliverables that are provided at M12, M24 and M36, respectively. Each of these 3 deliverables will describe the dissemination and communication activities implemented by the iSteel-Expert Consortium during a period of 12 months, apart from the last one which will also provide a final overview. All these 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 will 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 second 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 second year, some preliminary research results become available, that could be used within dissemination actions mostly devoted to the steel scientific, technical and industrial community. Moreover, the Consortium kept on raising awareness, curiosity, and interest towards the project in the European steel sector by means of the social network and the project website.

All the developed activities followed the Communication and Dissemination Plan (Deliverable D6.2), which proved to be well aligned with the aims and scope of the project, and presently does not need any revision, although some of the target values established for the KPIs turned out to be quite overambitious

This rest of document is divided into 4 main sections:

- Section 2 focuses on the activities that were carried out to raise awareness and interest toward the project in the European steel sector and to disseminate some preliminary outcomes.
- Section 3 describes the developed communication activities.
- Section 4 overviews the future events that are targeted by the Consortium to disseminate and communicate the project outcomes.
- Section 5 provides some concluding remarks and considerations for a fine tuning of the established Dissemination and Communication strategy to amplify the project impact and meet the ambitious targets that were identified at the beginning of the project in the Communication and Dissemination Plan (Deliverable D6.2).

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 second year of the project the Consortium exploited the preliminary research results which became available to carry out dissemination activities targeting industrial, scientific and technical audiences.

In particular, the following two conference papers were produced and presented:

- A. Bruzzone, K. Sinelshchikov, M. Massei, L. Cirillo, X. Sina, F. Ghisi, R. Ferrari, G.M. Ferraris, M. Cardelli, B. Gadupuri, J. Karim, P. Azadegan: Innovative Extended Reality and Simulation-based Training for Control Room Operators in Industry, *European Modeling and Simulation Symposium, EMSS*, within *International Multidisciplinary Modeling & Simulation Multiconference (I3M 2024)*, Tenerife, (Spain) September 18-20, 2024. <https://doi.org/10.46354/i3m.2024.emss.038>
- M. El Haddad, J. Possik, E. Jimenez Macías, M. Gotelli, R.A. Zeid Daou, C. Yaacoub: Towards Federating IoT and Simulation Systems: an HLA-Based Approach, *Annual Modeling and Simulation Conference (ANNSIM 2025)*, Madrid (Spain), May 26-29, 2025

The abstracts of the above-listed papers are reported in Subsections 2.1 and 2.2 respectively, while the D&C report related to the corresponding event, prepared according to the template available in the Dissemination and Communication Plan, is contained in **Appendix I**.

During the *International Multidisciplinary Modeling & Simulation Multiconference (I3M 2024)* a **first workshop** on advanced training solution was also organised by Sim4Future and UNIGE, which was attended by about 20 researchers and PhD students.

Moreover, the following presentations were provided, which discussed part of the results of the project:

- V. Colla: Critical applications of AI in the metals and steel industry, *EU-Japan Digital Week, Workshop "Critical Applications of AI in Industry, Healthcare and Other Sectors"* 31.03-07.04.2025 Tokyo (Japan).
- V. Scipolo, R. Girelli, F. Szlaszynski, F. Amadei: Intelligent Steel Expert: Let the Sensors Think, So You Can Thrive!, *Annual Iron and Steel technology Conference and Exposition AISTech 2025*, Nashville (TN, USA) May 5-8, 2025.
- M. Vannucci, V. Colla, M.W. Akram, A. Siddique, G. Bavestrelli: Eyes on Steel: AI-Powered Monitoring for Enhanced EAF Safety and Efficiency, *ESTEP Spring Dissemination Event 2025*, Krakow (Poland), June 5-6, 2025.

The first presentation was upon invitation, no abstract was submitted, but the D&C report related to the corresponding event is reported in **Appendix I**. The abstract of the second and third presentations

are reported in Subsections 2.3 and 2.4 respectively, and the D&C report related to the corresponding events are reported in **Appendix I**. Noticeably, the presentation at AISTech 2025 was particularly helpful in raising awareness of the project results, as the audience of this event was enormous and the possibility to gathering feedback and exchange opinions was amplified by the fact that Tenova also held a big booth at the connected exhibition, where the presenter and other personnel involved in the project could discuss about the research work and future exploitation of its results with a wide industrial audience.

As far as dissemination actions already planned for the upcoming months, the following abstract authored by SSSA and TENOVA was accepted for presentation at the 7th *European Steel and Application Days (ESTAD 2025)*, which will be held in Verona (Italy), on October 6-9, 2025.

1. Zamproni, A. Siddique, G. Bavestrelli, M. Vannucci, M.W. Akram, V. Colla: AI-Powered IT Infrastructure for Enhanced Safety in EAF Operations

The paper is under preparation and must be delivered by July 25, 2025.

Moreover, 2 papers (1 by SSSA+TENOVA and 1 by UNIRIO+UCL+UNIGE), were submitted for presentation at the 14th *IEEE International Conference on Image Processing Theory, Tools and Applications (IPTA 2025)*, which will be held in Istanbul (Turkey) on October 13-16, 2025. The papers are currently under review.

Details on these two last dissemination activities will be provided in the third Report on Dissemination activities (Deliverable D6.8), which will summarise all the Dissemination and Communication activities implemented in the project, including the third year.

2.1 Innovative Extended Reality and Simulation-based Training for Control Room Operators in Industry

Authors:

Agostino Bruzzone^{a,b}, Kirill Sinelshchikov^a, Marina Massei^{a,b}, Luca Cirillo^b, Xhulia Sina^a, Filippo Ghisi^b, Roberto Ferrari^b, Giovanni Maria Ferraris^{a,b}, Marina Cardelli^a, Bharath Gadupuri^b, Karim Javed^b, Pooriya Azadegan^b

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Modern industrial plants are characterized by high level of automation, however, there are still numerous facilities which only partially benefit from it for various reasons. In this paper, the authors investigate existing training procedures for control rooms' operators in the old economy and analyze particular case study of Electric Arc Furnaces (EAF) operations. Finally, it is proposed a strategy to adopt simulation-based training solution for the plant operators with analysis of expected benefits.

2.2 Towards Federating IoT and Simulation Systems: an HLA-Based Approach

Authors:

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

Emilio Jimenez Macías: University of La Rioja, Logroño, La Rioja (Spain).

Marco Gotelli: Università di Genova, Genova (Italy).

Roy Abi Zeid Daou: Université de la Sagesse, Beirut (Lebanon).

Physical electronic devices interconnect using Internet of Things (IoT) networks, enabling them to collect, transform, and exchange data. In addition, IoT networks enable real-time access, monitoring, and control of physical devices across various applications. On the other hand, complex and dynamic environments are modelled using distributed simulations (DS) which enable them to communicate in a synchronous way. Hence, the combination of IoT devices' power to exchange data in real-time and the power of distributed simulation environments offers a promising synergy to advance and even revolutionize fields such as system modelling, decision-making, and training. This paper presents an approach for integrating Arduino-based IoT system with an AnyLogic simulation using the High-Level Architecture (HLA) international standard. The proposed system enables real-time data exchange between simulations and physical devices, enhancing both accuracy and adaptability.

2.3 Intelligent Steel Expert: Let the Sensors Think, So You Can Thrive!

Authors:

Vittorio Scipolo, Filip Szlaszynski: Tenova Goodfellow Inc. Mississauga (ON, Canada).

Renato Girelli Franco Amadei: Tenova S.p.A., Castellanza, Italy.

iSteel-Expert integrates a suite of advanced sensors and AI-driven models designed to optimize and automate monitoring in steelmaking plants. This system provides real-time data analysis and customized reporting, enabling plant personnel to make informed decisions quickly and efficiently. By combining data from existing plant sensors with additional measurements from the iSteel-Expert sensor suite, the system offers comprehensive key performance indicators for process optimization, asset management and safety enhancement. This presentation will highlight the key features of iSteel-Expert, share preliminary data from the initial deployment, and discuss its impact on reducing manual intervention and enhancing decision-making in steel production.

2.4 Eyes on Steel: AI-Powered Monitoring for Enhanced EAF Safety and Efficiency

Authors:

Marco Vannucci, Valentina Colla, Muhammad Waseem Akram, Arslan Siddique, Scuola Superiore Sant'Anna, Pisa (Italy).

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

The iSteel-Expert project introduces a cutting-edge, AI-based monitoring and safety system 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 leverages advanced deep learning models to automate the detection and classification of critical events and safety conditions around the furnace. This approach significantly enhances both operational safety and process efficiency. The monitoring framework covers five key tasks:

1. **Person Detection Around the EAF:** Identifies unauthorized or accidental human presence in hazardous zones, triggering immediate alarms.
2. **Slag Door Status Detection:** Monitors and classifies the slag door as open or closed, flagging unsafe or abnormal openings.
3. **Clamp Detection for Electrode Monitoring:** Detects the presence and movement of electrode clamps, identifying irregularities that may indicate maintenance needs.
4. **Smoke Detection Around the Electrode:** Detection of vapor, fumes, and dense smoke, alerting operators to abnormal emissions.
5. **Furnace Tilt Detection:** Classifies the furnace as upright or tilted, enabling or disabling electrode monitoring accordingly.

A substantial dataset was collected for model training and validation, comprising over 4,300 images for person detection, slag door, clamp, smoke, and tilt tasks. The system achieved high performance across all tasks, with top-1 accuracy reaching more than 90% for furnace tilt detection and for smoke detection. Object detection tasks reported high precision, recall, and F1-scores, demonstrating robust and reliable event recognition.

Looking forward, iSteel-Expert's capabilities extend to predictive maintenance by identifying patterns indicative of equipment wear or potential failures. It also enables process optimization through real-time monitoring and analysis of EAF operations. Furthermore, it facilitates seamless integration with advanced plant control systems, supporting safer, more efficient, and sustainable steel production.

2.5 Achievement status of the established dissemination targets

The dissemination actions which were carried out in the second year enabled a good progress can be in the achievement of some 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, as already mentioned above, the AISTech 2025 Conference and Exhibition proved to be very effective and generated relevant feedback on the project, thanks to its enormous and qualified audience and to the presence of TENOVA also as exhibitor. Therefore, the TENOVA and SSSA plan to attend also the 2026 edition of the same event.

At the present status of the project, the dissemination strategy appears appropriate and does not need revision, although some of the target values for the KPIs appear quite overambitious, considering the present contingency of the steel sector, which might limit the possibility to attend a big number of events. Nonetheless, the attendance to “big” events, such as ESTAD 2025 and AISTech 2026 will still allow reaching a very wide and diversified international audience and mobilising the interests toward the project outcomes, which is the final target of dissemination.

Table 1. 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.	6	0	0%	
	No of downloads for the published papers overall	3000	0	0%	
Presentations, lectures, posters in conferences, congresses and workshops	No of papers published in proceedings of international conferences and workshops	10	2	20%	
	No of presentations/posters discussed in international scientific events	40	4	10%	
	No of persons in the general audience reached in the attended scientific events	5000	≈8535	171%	
Internal seminars and dissemination events	No of internal partners' events;	5	0	0%	
	No of pilot training sessions related to the outcomes of the project and some of the developed tools	3	0	0%	
Webinars and seminars on iSteel-Expert outcomes	No of webinars and seminars	3	1	33%	
	No of persons overall attending the held webinars and seminars	150	20	13%	
Presentations in events promoted by EU initiatives, platforms, and associations	No of presentations	2	1	50%	
	No of experts and industrial representatives reached in the presentation events	100	55	55%	
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	0	0%	
	No of joint activities put in place with some of the previously identified and contacted projects	2	0	0%	
iSteel-Expert final Workshop	No of presentations held during the Workshop both by iSteel-Expert beneficiaries and by external experts	5	0	0%	
	No of attendees	100	0	0%	

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 1450 total views (4433 events) from 665 different users, such as depicted in **Figure 2**, which shows the time trend of the visits of the website since the first day it was online until June 2025. **Figure 3** shows the geographical distribution of the visitors of the project website.



Figure 1. Time trend of the number of visitors of the project website starting from 01.12.2023.



Figure 2. Geographical distribution of the visitors of the project website.

From the website, 248 document downloads were registered, among which 114 downloads of the project newsletters.

3.2 LinkedIn Account

A LinkedIn account was created for the project at the end of July 2023 (see also Deliverable D6.2) and presently holds 940 followers. 16 posts were published, which gathered a total of about 19500 impressions and 88 reposts. The time trend of the visitors who accessed the iSteel-Expert page on LinkedIn (based on the LinkedIn analytics) is shown in **Figure 4**, while the distribution of their sectors is shown in **Figure 5**.

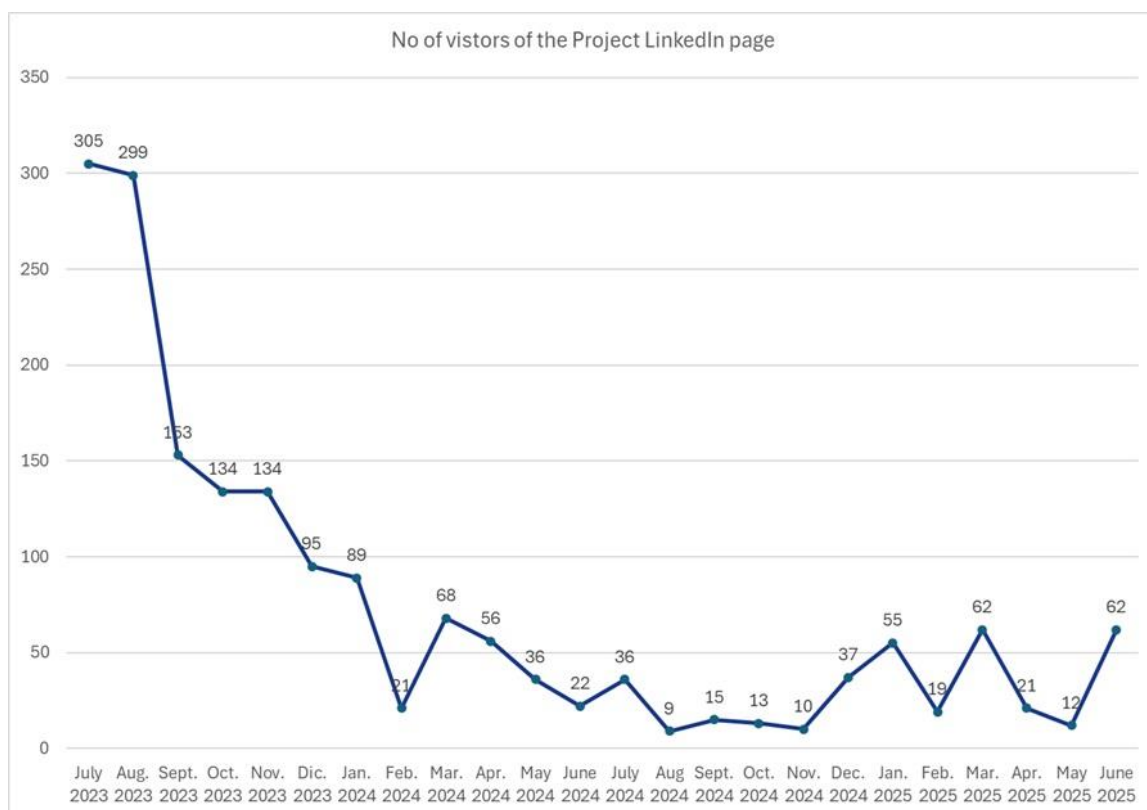


Figure 3. Time trend of the visitors of the LinkedIn page of the project.

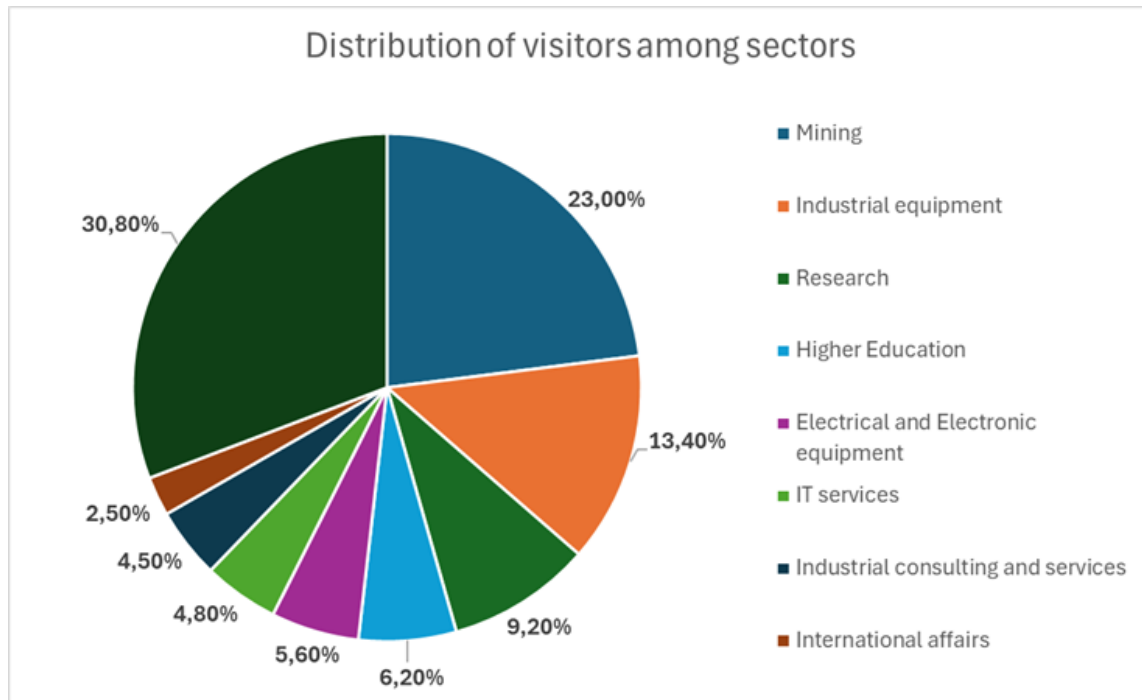


Figure 4. Distribution of the visitors among sectors of the LinkedIn page of the project.

3.3 Newsletters and press releases

In line with the target established in the Dissemination and Communication plan, 2 newsletters were issued in the second year of the project, the first one focused on the outcome of the image processing activities carried out by TENOVA and SSSA, the second one summarising the status of the project and its upcoming challenges.

Moreover, the following 3 press releases were issued:

1. an article in French entitled “*iSteel-Expert : une année de progrès pour la sidérurgie durable*” on the online magazine *Machine Production*. The article is available online at <https://www.machinesproduction.fr/article/isteel-expert-une-annee-de-progres-pour-la-siderurgie-durable> and its English translation is provided in **Appendix II**. The same paper was afterwards published also on the magazine *Fluids and Lubricants* and became available online also at the link <https://fluidsandlubricants.com/2024/09/11/isteel-expert-une-annee-de-progres-pour-la-siderurgie-durable/>
2. an article in Italian published on the Corporate Magazine of the Pittini group (see **Figure 5**), whose English translation is provided in **Appendix III**.
3. an article published on 31.03.2025 Italian daily newspaper *Il Tirreno*, in the Section Economy of Tuscany (Toscana Economia). The article provides an overview of 3 research projects (among which iSteel-Expert) that apply Artificial Intelligence to improve the sustainability of steel production where Scuola Superiore Sant’Anna is involved. *Il Tirreno* belongs to a big Italian editorial group and in March 2025 ranked 20th among the Italian newspapers for sale of

paper version of the newspaper¹, being widely spread in Tuscany, northern Latium and southern Liguria. It holds an estimated total number of readers (considering both paper and online version) equal to about 246.000². **Figure 6** shows the article as it appeared on the “physical” version of the newspaper, and the part concerning iSteel-Expert is highlighted in red. However, the article was also published on the online version of the Journal available to the subscribers, and in this version a link was also reported to the website of the project. The English translation of this press release is provided in **Appendix IV**.

¹ Data related to March 2025, Source Prima Comunicazione, [*https://www.primaonline.it/2025/05/08/440154/classifiche-e-trend-diffusione-quotidiani-corsera-rep-gazzetta-e-fatto-si-salvano/](https://www.primaonline.it/2025/05/08/440154/classifiche-e-trend-diffusione-quotidiani-corsera-rep-gazzetta-e-fatto-si-salvano/) last access May 8, 2025.

² Source Datastampa <https://www.datastampa.it/>



Inquadra il
QR e visita la
pagina LinkedIn
del progetto



Quali tecnologie vengono adottate per migliorare la produzione di acciaio?

VO: Innanzitutto, sono stati installati sensori appositamente progettati per supportare le impegnative condizioni ambientali delle acciaierie. Questi sensori raccolgono dati in tempo reale provenienti da diverse fonti e in formati diversi. I dati vengono poi inviati a una stazione di preelaborazione locale, che li analizza per estrarre le informazioni più rilevanti, come segnali video, acustici, vibrazionali e di temperatura, riducendo così la quantità di dati trasferiti al sistema centrale. S.D.S.: Il cuore del progetto è un'infrastruttura cloud che elabora questi dati tramite algoritmi avanzati, inclusi quelli di Machine Learning (sistema che analizza dati storici per ottimizzare processi produttivi e prevedere eventi futuri), per elaborare i KPI e altre informazioni utili. Questi risultati sono presentati in modo chiaro e facilmente comprensibile tramite dashboard accessibili online.

Quali sono i benefici attesi per le aziende, soprattutto nel caso particolare di Siderpotenza?

G.S.: iSteel-Expert introduce un sistema virtuale in grado di monitorare il processo di produzione dell'acciaio 24 ore su 24, 7 giorni su 7, funzionando così come un "esperto virtuale". Utilizza tecnologie IoT (Internet of Things, rete di dispositivi connessi che raccolgono e condividono dati in tempo

reale), aiutando gli operatori a ottimizzare e correggere le operazioni. Il sistema fornisce suggerimenti per migliorare la qualità delle informazioni provenienti dal forno e supporta le decisioni operative e la manutenzione. Inoltre, rileva tempestivamente eventuali problemi, analizzando cause e conseguenze.

Un altro aspetto centrale di questo progetto è la sostenibilità. In che modo iSteel-Expert contribuisce concretamente alla riduzione dell'impatto ambientale nella produzione dell'acciaio?

VO: iSteel-Expert contribuisce a rendere la produzione più sostenibile grazie alle sue diverse funzionalità. Il sistema monitora elettrodi, gestisce le scorie, ottimizza il caricamento della cеста e rileva le vibrazioni. Queste operazioni permettono di ridurre il consumo energetico, diminuendo sia le emissioni di fumi che quelle sonore, migliorando così il comfort acustico all'interno dello stabilimento e nelle aree circostanti. La raccolta e l'analisi dei dati aiuta inoltre responsabili e operatori a prendere decisioni più rapide e mirate, riducendo così l'impatto ambientale della produzione, mantenendo alta la qualità del prodotto e garantendo il corretto funzionamento degli impianti.

Considerato il ruolo cruciale della formazione in questo progetto, in che modo iSteel-Expert contribuisce allo sviluppo del know-how aziendale e alla preparazione degli operatori?

S.D.S.: iSteel-Expert ha come obiettivo principale proprio la conservazione e l'evoluzione delle competenze aziendali. Digitalizzando le conoscenze e l'esperienza degli operatori più esperti, evitiamo la perdita di know-how e valorizziamo le competenze interne. Inoltre, grazie all'uso di dati avanzati e KPI, combinati con una formazione innovativa basata su simulazioni interattive e tecniche di gaming, offriamo una soluzione mo-



Dall'alto: Giuseppe SATRIANO, Vincenzo ORLANDO e Silvia DE SIO.

DIGITALIZZAZIONE E SIDERURGIA
Trasformazione digitale nell'industria dell'acciaio: il progetto iSteel-Expert

Un progetto di ricerca che ha l'obiettivo di ottimizzare l'efficienza, la sostenibilità e la sicurezza nella produzione di acciaio, utilizzando l'intelligenza artificiale e l'automazione. Abbiamo approfondito il tema con Giuseppe Satriano, Vincenzo Orlando e Silvia De Sio, impegnati nell'attuazione del progetto all'interno dell'acciaieria di Siderpotenza.

Quali sono i principali obiettivi di iSteel-Expert?

Giuseppe Satriano: iSteel-Expert è un progetto co-finanziato dall'Unione Europea, che coinvolge diversi partner (Siderpotenza, Tenova, Scuola Superiore Sant'Anna, SIM4Future, Lille Catholic University, Universidad de La Rioja) e mira a migliorare la produzione di acciaio attraverso tecnologie avanzate. Uno degli obiettivi principali del progetto è preservare e far evolvere il know-how aziendale. Questo viene realizzato digitalizzando l'esperienza degli operatori più qualificati e trasformandola in una piattaforma interattiva, che utilizza dinamiche di tipo "gaming" per facilitare l'apprendimento.

Vincenzo Orlando: Inoltre, iSteel-Expert punta a ottimizzare l'efficienza del processo di fusione e delle attrezzature utilizzate, grazie all'impiego dell'intelligenza artificiale (AI, Artificial Intelligence). Analizzando i dati delle colate, il sistema fornisce in tempo reale informazioni utili per migliorare continuamente il processo di fusione, garantendo il rispetto dei parametri di performance (KPI, Key Performance Indicator) richiesti. L'AI aiuta anche gli operatori a identificare rapidamente eventuali problemi impiantistici e a mettere in atto le contromisure più efficaci per evitare le ripercussioni.

Silvia De Sio: Un altro aspetto cruciale del progetto è la sicurezza degli operatori. iSteel-Expert riduce la necessità di interventi diretti a bordo macchina durante il ciclo produttivo, migliorando così la sicurezza dei lavoratori.

Quali sono le tappe principali del progetto?

G.S.: Il progetto è suddiviso in sette fasi (work packages, WP), complementari e interconnesse, con una durata complessiva di 36 mesi. Ogni fase ha obiettivi specifici. Inizialmente, abbiamo installato sensori e attrezzature, definito gli indicatori di prestazione (KPI) e analizzato i requisiti per il sistema di formazione (WP1). Poi, abbiamo lavorato all'infrastruttura per raccogliere e analizzare i dati dagli impianti (WP2). Successivamente, abbiamo sviluppato gli algoritmi per identificare eventi critici durante la fusione e suggerire azioni correttive (WP3). Un'altra parte importante è la creazione di strumenti didattici per formare gli operatori (WP4). Infine, stiamo testando il sistema sul campo per valutarne l'efficacia e la possibilità di applicarlo altrove (WP5), diffondendo i risultati ottenuti (WP6) e gestendo la coordinazione generale del progetto per assicurarci che tutto sia completato con successo (WP7).

Figure 5. Press release issued on the Corporate Magazine of the Pittini Group.



Figure 6. Press release issued on the Italian newspaper Il Tirreno.

3.4 Achievement status of the established communication targets

Table 2 present the current value of the established KPIs for communication activities and compares them with the target values established in the Dissemination and Communication Plan (Deliverable D6.2). Such values are very ambitious, but good progresses were made on several of them in the second year.

A greater effort was spent by the Consortium towards press releases in the second year, compared to the first one, thanks to the availability of some research results to showcase. This trend is foreseen to continue in the third year, when approaching the conclusion of the project.

The presentations in events organized by or relevant to EU, platforms, and associations. Publications in EC's communication channels and the communications and seminars dedicated to students and young minds as well as to gender equality are clearly foreseen mostly for the last year of the project.

Table 2. 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	10,000	1450	15%	
	No of documents downloads	1,000	248	25%	
	No of persons in the total audience reached	40,000	1761	4.4%	
Newsletters and bulletins	No press of releases with news, events, and information of interest (target 2/y)	4	4	100%	
	No of newsletters with news, events, and information of interest (target 2/y)	4	4	100%	
	No of readers	5,000	1435*	29%	
Production of communication material	No of leaflets/brochures produced in the project.	2	0	0%	
	No of videos generated during the project.	2	0	0%	
Press releases to newspapers and social media.	No of social media followers	3,000	940	31%	
	No of persons in the reached audience	5,000	≈15000	300%	
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	0	0%	
	No of publications on EC communication mean	1	0	0%	
Attendance to exhibitions/trade fairs	No of exhibitions or trade fairs attended	6	1	17%	
	Overall No of persons in the audience of the attended exhibitions and trade fairs	2,500	8080	323%	
Communications and seminars dedicated to students and young minds	Overall no of students reached	300	0	0%	
Communications and seminars dedicated to gender equality	No of presentations on gender equality in project event	1	0	0%	
	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 the number of visitors of the LinkedIn account and views of the press releases and 5% of the readers of the newspaper "Il Tirreno" in its paper and online version (≈12300).

4. Future targeted events

During regular meetings (Steering Committee meetings and 6-monthly General Assemblies) and, more in general, during the project execution, the iSteel-Expert consortium periodically analyses the events being planned and update the list of potential targets for iSteel-Expert. The target events include conferences, workshops, exhibitions and other dissemination and communication opportunities, where the Consortium can make presentations to share the results of the work carried out in iSteel-Expert, as well as trade fairs, exhibitions and dissemination and communication initiatives organised by the EU.

This list of potentially relevant events established in the Dissemination and Communication Plan established at the beginning of the project (Deliverable D6.2) and revised at the end of the first year (see Deliverable D6.4) has been further updated at the end of the second year to reflect future opportunities for disseminating and communicating the project outcomes, and **Table 5** provides the list of future events identified by the Consortium at the date of delivery of the present document.

Table 3. list of relevant events (question marks are included when the exact dates or locations are still undefined).

Event	Date	Location	Description
XXII International Multidisciplinary Modelling and Simulation Multiconference I3M 2025	17-19.09.2025	Fes (Morocco)	Main outcomes related to WP4
7 th European Steel and Application Days (ESTAD 2025)	6-9.10.2025	Verona (IT)	Main outcomes related to WPs 2-3
ESTEP Annual Dissemination Event	28-30.10.2025	Buttrio (IT)	Main outcomes related to WPs 2-3
DTMI 2025 - International Workshop Carlo Longaretti on Digital Tools for the Metallurgical Industry	27-28.11.2025	Bergamo (IT)	Main outcomes related to WPs 2-4
Annual Iron & Steel Technology Conference and Exposition	4-7.05.2025	Pittsburgh (USA)	Final Project results
14 th European Electric Arc Furnace Conference EEC 2026	11-13.05.2026	Brescia (IT)	Final Project results
41 th Congress of the Italian Association of Metallurgy	??.09.2026	??? (IT)	Final project results
XXIII International Multidisciplinary Modelling and Simulation Multiconference I3M 2026	??.09.2026	???	Final project results mainly related to WP4
34 th European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN 2025)	??.10.2026	Bruges (BE)	Final project results

5. Conclusions

In the second year of the project the iSteel-Expert consortium intensified the Dissemination and Communication activities. The elaborated Dissemination and Communication plan proved to be effective, although some of the established KPIS turned out to be very ambitious. In general, the partners showed a positive and collaborative attitude in spreading research objectives, ambitions, concepts and preliminary outcomes. This enabled a good progress on the achievement of the established target values of some of the identified KPIS for Dissemination and Communication.

Moreover, the Consortium is seeking connections and identifying opportunities for synergies with other EU-funded research initiatives.

The Consortium also identified some margins for improvements to be stressed for dissemination and communication activities, also based on the expected results, especially as regard to:

- publications in scientific journals;
- organisation of internal workshop and seminars devoted to students and female researches;
- organisation of clustering initiatives with other EU funded projects.

Finally, in the third year the Final project Workshop will be organised.

6. Appendix I – Information on attended Dissemination events

Event information	
Event name (and acronym)	International Multidisciplinary Modeling & Simulation Multiconference (I3M 2024)
Type of event	Conference (Scientific Event)
Date	September 18-20, 2024
Location	Tenerife, Spain
Geographic coverage	Europe, USA, Russia, Canada, Sudan, Thailand, Qatar, Ecuador, Morocco, Tunisia
Type of audience	Modeling and Simulation experts, PhD students, Industry
Approximate size of audience	Approximately 200 persons
Short description	The I3M Multiconference reaffirms its commitment to bringing together researchers, scientists, and practitioners from the Mediterranean region, Latin and North America, Europe, Asia, Africa, and Australia, all engaged in the field of Modelling and Simulation within both industry and academia. As a result of the collective effort of numerous centres of scientific excellence, I3M provides a valuable platform for meaningful exchange, constructive debate, and open dialogue. Such interactions not only stimulate new ideas and perspectives but also foster interdisciplinary cooperation and promote fruitful collaborations.
Information about dissemination activity	
Presentation title	Innovative Extended Reality and Simulation-based Training for Control Room Operators in Industry
Presenter	Kirill Sinelshchikov (SIM4Future)
Other partners involved	UNICL, UNIRIO
Hashtag(s) for Social Media	#steel #training #digitalisation #EAF
Attachments (e.g. agenda, invitation)	Program

I3M 2024

The 21st International Multidisciplinary Modeling & Simulation Multiconference

Superior School of Engineering and Technology,
University of La Laguna, Tenerife, Spain

18-20 September 2024

(For online Participants, the Conference Time is
Tenerife Local Time - WEST)

Final Program

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Organized by



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I3M 2024 Partners

The I3M 2024 Organization Committee thanks all the partners and institutions for their support to the event

I3M 2024

List of Conferences and Workshop

Scientific Partners



Industrial Sponsors



Media Partners



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The 21st International Multidisciplinary Modelling & Simulation Multiconference (I3M 2024) involves EMSS, HMS, MAS, IMAACA, DHSS, IWISH, SESDE, FOODOPS, Conferences, Workshops and related Special Sessions; Sessions are open to all I3M Attendees.

- EMSS: European Modelling & Simulation Symposium, 36th Edition, Part of I3M 2024.
- HMS: The International Conference on Harbour, Maritime & Multimodal Logistics Modelling and Simulation, 26th Edition, Part of I3M 2024.
- MAS: The International Conference on Modelling & Applied Simulation, 23rd Edition, Part of I3M 2024.
- IMAACA: The International Conference on Integrated Modeling and Analysis in Applied Control and Automation, 17th Edition, Part of I3M 2024.
- DHSS: The International Defense and Homeland Security Simulation Workshop, 14th Edition, Part of I3M 2024.
- IWISH: The International Workshop on Innovative Simulation for Healthcare, 13th Edition, Part of I3M 2024.
- SESDE: The International Workshop on Simulation for Energy, Sustainable Development & Environment, 12th Edition, Part of I3M 2024.
- FOODOPS: The International Food Operations and Processing Simulation Workshop, 10th Edition, Part of I3M 2024.
- Special Sessions: I3M Special Sessions are freely open to all the attendees (e.g., Opening Ceremony, I3M 2024 Special sessions, etc.).

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I3M 2024 Organization Committees

Organization Committees

I3M 2024 General co-Chairs

Agostino G. Bruzzone - DIME - University of Genoa, Italy
Yuri Merkuryev - Department of M&S, Riga TU, Latvia

I3M 2024 Program co-Chairs

Francesco Longo - MSC-LES, DIMEG, University of Calabria, Italy
Miquel Angel Piera - Autonomous University of Barcelona, Spain

EMSS: The 36th European Modelling & Simulation Symposium

EMSS General co-Chairs:

Francesco Longo, MSC-LES, DIMEG, University of Calabria, Italy
Emilio Jiménez, La Rioja University, Spain

EMSS Program co-Chairs:

Michael Affenzeller, Upper Austria University of Applied Sciences, Austria
Antonella Pettillo, Parthenope University of Naples, Italy

HMS: The 26th International Conference on Harbour, Maritime & Multimodal Logistics Modelling and Simulation

HMS General co-Chairs:

Agostino Bruzzone, DIMEG, University of Genoa, Italy
Yuri Merkuryev, Riga Technical University, Latvia

HMS Program co-Chairs:

Eleonora Bottani, University of Parma, Italy
Miquel Angel Piera - Autonomous University of Barcelona, Spain

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SESE: The 12th International Workshop on Simulation for Energy, Sustainable Development & Environment

SESE General co-Chairs:

Claudia Frydman, Laboratoire d'Informatique et Systèmes, France
Gregory Zacharewicz, Ecole des Mines d'Alès, France

SESE Program co-Chairs:

Juan Albino Méndez Pérez, University of La Laguna, Spain
Antonio Cimino, University of Salento, Italy

FOODOPS: The 10th International Food Operations and Processing Simulation Workshop

FOODOPS General co-Chairs:

Giuseppe Vignali, University of Parma, Italy
Francesco Longo, University of Calabria, Italy

FOODOPS Program Chair:

Vittorio Solina, University of Calabria, Italy

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MAS: The 23rd International Conference on Modelling & Applied Simulation

MAS General co-Chairs:

Marina Massei, Liophant Simulation, Italy
Adriano Solis, York University, Canada

MAS Program co-Chairs:

Fabio De Felice, University of Cassino, Italy
Iván Castilla Rodríguez, University of La Laguna, Spain

IMAACA: The 17th International Conference on Integrated Modeling and Analysis in Applied Control and Automation

IMAACA General Chair:

Sergio Junco, Universidad Nacional de Rosario, Argentina

IMAACA Program Chair:

Loucas Louca, University of Cyprus, Cyprus

IMAACA Honorary Chair:

Geneviève Dauphin-Tanguy, France

DHSS: The 14th International Defense and Homeland Security Simulation Workshop

DHSS General Chair:

Agostino Bruzzone, DIME, University of Genoa, Italy

DHSS Program Chair:

Benjamin Goldberg, US Army DEVCOM Soldier Center, USA

IWISH: The 13th International Workshop on Innovative Simulation for Health Care

IWISH General co-Chairs:

Marco Frascio, University of Genoa, Italy
Vera Novak, BIDMC, Harvard Medical School, USA

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I3M 2024 Hybrid Conference

All the sessions will be physically chaired. If you are a Session Chair, please follow the instructions reported below.

Procedure for Sessions' Chairs

If you are a Session Chair, below you can find the procedure you are required to follow to manage your session.

- 1) Please be sure to join the Session Room at least 15 minutes before the Session scheduled time.
- 2) Check the presence of the speakers in the room and ask them some basic information to properly introduce them before their speeches. Please ask the speakers to upload their presentations on the laptop.
- 3) Some of the speakers will be online. Please ask them some basic information to properly introduce them. Familiarize yourself with the Microsoft TEAMS meeting functionalities (e.g., camera and microphone controls, desktop sharing, etc.). You can easily find all these functionalities on the screen. A session assistant will be there to start the Microsoft TEAMS session for online participants and to help you if needed.
- 4) Keep the computer camera and microphone switched ON. At the time of the session, you can introduce yourself as Session Chair and you can start the Session. Please be sure to stay close to the microphone to be sure that online participants can hear you well.
- 5) **If you have in person speakers in your session:**
 - a. Be sure to share the screen of the presentation on Microsoft TEAMS (so the online attendees can follow the presentation).
 - b. Ask the speaker to stay close to the microphone (to allow online attendees to listen properly).
 - c. After the presentation, please check if there are questions from physical and online participants. If there are no questions, please be prepared to "break the ice" by doing the first question.
- 6) **If you have online speakers in your session:**
 - a. Ask the speaker to switch the microphone and the camera ON and introduce the speaker.
 - b. Ask the speaker to share the screen of the presentation on Microsoft TEAMS (so all the attendees can follow the presentation).
 - c. After the presentation, please check if there are questions from physical and online participants. If there are no questions, please be prepared to "break the ice" by doing the first question. After question time, remember the online speaker to switch the camera and the microphone OFF.

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I3M 2024

Hybrid Conference

All the sessions will be held in a hybrid mode both in presence and online (through Microsoft TEAMS). If you are an "In presence" or "online" speaker please follow the instructions reported below.

Procedure for "in presence" Speakers

If you are an "in presence" Speaker, below you can find the procedure you are required to follow to make your presentation.

- Please join the session at least 15 minutes before the scheduled time and present yourself to the Session Chair.
- At a certain point in time (according to the scheduling of the presentations in the session), the Session Chair will call your name, present you and invite you to join the floor. Please be sure that the screen of the computer is shared on TEAMS.
- Please stay close to the microphone when doing your presentation (so the "online" participants can easily listen your presentation).
- Your presentation must not exceed 10-12 minutes. Be ready to answer questions made by session's attendees.

Procedure for "online" Speakers (Conference time is Tenerife Local Time, WEST)

If you are an "online" Speaker, below you can find the procedure you are required to follow to make your presentation.

- Please join the session at least 15 minutes before the scheduled time and present yourself to the Session Chair (you can switch your camera and microphone ON). You can easily find the name of the Session Chair within the Conference Program. After presenting yourself to the Session Chair, please switch your camera and microphone OFF.
- At a certain point in time (according to the scheduling of the presentations in the session), the Session Chair will call your name, present you and invite you to share your screen and your presentation. At this time, please switch your microphone and your camera ON, share your screen, your presentation and present your work.
- Your presentation must not exceed 10-12 minutes. Be ready to answer questions made by session's attendees.
- After the presentation and questions time, please be sure to switch your microphone and camera OFF.
- Please note that you have been required by email to upload a video of your presentation on a shared folder. This video will be used by the session chair in case of problems (e.g., you are not able to do your presentation due to internet connection problems).

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I3M 2024

Hybrid Conference

All the sessions will be held in a hybrid mode both in presence and online (through Microsoft TEAMS). If you are an "In presence" attendee or an "online" attendee, please follow the instructions reported below.

Procedure for "in presence" Session Attendees

If you are an "in presence" Session Attendee, below you can find the procedure you are required to follow during the Session.

- Please join the Session at the scheduled time according to the conference program.
- You will be allowed to make questions at the end of each presentation. Please be sure to raise your hand in case of question. The Session Chair will allow you the make the question.
- When you ask the question, please remember to stay close to the microphone or to be sure that the online attendees (or speaker) can correctly hear your question (if needed the chair of the session can repeat your question for the online attendees).

Procedure for "online" Session Attendees (Conference time is Tenerife Local Time, WEST)

If you are an "online" Session Attendee, below you can find the procedure you are required to follow during the Session.

- Please join the session at the scheduled time (conference time is Tenerife Local Time, WEST) according to the conference program. The links to join the sessions are reported within the program in correspondence of each session. Once you join the session, please be sure to switch your microphone and camera OFF.
- You will be allowed to make questions at the end of each presentation. Please be sure to raise your hand in case of question (you have to click on the "raised hand" symbol in Microsoft TEAMS. The Session Chair will allow you the make the question by calling your name).
- When you ask the question, please remember to switch your microphone and camera ON.
- After the interaction with the Speaker please remember to switch your microphone and camera OFF.

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I3M 2024

Activities and Sessions Details

Wednesday, September 18th

09:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Aula Magna de Física y Matemáticas, Faculty of Physics and Mathematics, Floor 0	Wed 18 th , 2024
Microsoft Teams, Session Link: Access the Online Session	
I3M 2024 Opening Ceremony Chair: Agostino Bruzzone, DIME, University of Genoa, Italy • Welcome Message – Prof. Agostino Bruzzone, DIME, University of Genoa, Italy • Welcome Message – Prof. Antonio Aparicio Juan, Vice-Chancellor of Research, University of La Laguna, Spain • Welcome Message – Prof. Jonas Philipp Luke, Subdirector of the Computer Science Section, University of La Laguna, Spain • Welcome Message – Prof. Ivan Castilla Rodríguez, I3M 2024 Local Committee Chair, University of La Laguna, Spain • EMSS Conference – Prof. Francesco Longo, University of Calabria • HMS Conference – Prof. Yuri Merkuriev, Riga Technical University, Latvia • IWISH Workshop – Prof. Marco Frascio, University of Genoa, Italy • MAS Conference – Prof. Adriano Solis, York University, Canada • IMARCA Conference – Prof. Sergio Junco, Universidad Nacional de Rosario, Argentina • DHSS Conference – Prof. Agostino Bruzzone, DIME, University of Genoa, Italy • SESSE Workshop – Prof. Gregory Zecherewicz, Ecole des Mines d'Alès, France • FOODOPS Workshop – Prof. Giuseppe Vignali, University of Parma, Italy • Liophant – Dr. Marina Maszel, University of Genoa, Italy • MISS & MSNet Societies and Simulation Team – Prof. Emilio Jiménez, La Rioja University, Spain • I3M 2025 and Conference Updates - Claudia Frydman, LIS, France and Prof. Agostino Bruzzone, University of Genoa, Italy	

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10:30 am – 11:00 am Tenerife Local Time
Coffee Break

11:00 am – 12:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Aula Magna de Física y Matemáticas, Faculty of Physics and Mathematics, Floor 0	Wed 18th, 2024
Microsoft Teams, Session Link: Access the Online Session	
I3M 2024 Plenary Session Speeches Chair: Prof. Agostino G. Bruzzone, DIME, University of Genoa, Italy > Prof. Giuseppe Vignali, University of Parma, Italy Simulation and modeling in the food industry: Past, Present and Future research > Prof. Juan Albino Méndez Pérez, University of La Laguna, Spain Modelling and management of Energy Communities > Prof. Shaun West, Lucerne University of Applied Sciences and Arts, Switzerland SimCity for the Real World: Harnessing Model Trains, Simulations, and Digital Twins for Dynamic Decision-Making	

12:30 pm – 2:00 pm Tenerife Local Time, WEST
Lunch Break

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2:00 pm – 3:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Salón de Grados de la Escuela Superior de Ingeniería y Tecnología, Floor 2	Wed 18th, 2024
Microsoft Teams, Session Link: Access the Online Session	
FOODOPS Special Session - The SMALLDERS Project Chair(s): <i>Vittorio Solina, University of Calabria</i> - IBM_33: Exploring Novel Sustainability Metrics for the Agri-Food Supply Chain <i>Ayia Amamou, Chourouk Ben Taouass, Lila Sidiham and Abdelkader Mami</i> - IBM_34: Role of Life Cycle Assessment (LCA) in Promoting Olive Oil Sustainability: A State-of-the-Art Review <i>Ilyes Dammak, Ayia Amamou, Lila Sidiham and Abdelkader Mami</i> - IBM_37: Implementation of Automatic Identification and Data Capturing technologies in the Agri-Food Supply Chains: a review and framework <i>Eleonora Bottani, Roberto Stefanini and Giuseppe Vignoli</i> - IBM_79: Finding the Perfect Match: Smallholder Selection in Short Food Supply Chains <i>Manuela Germanos, Oussama Ben-Ammer and Greg Zacharewicz</i> - IBM_84: Generative AI for Business Model Generation (GAI4BM): from Textual Description to Business Process Model <i>Nicolas Dacín, Sihem Malik-Dacín and Gregory Zacharewicz</i>	

2:00 pm – 3:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Room 1.4, Escuela Superior de Ingeniería y Tecnología, Floor 0	Wed 18th, 2024
Microsoft Teams, Session Link: Access the Online Session	
MAS-EMSS: Innovative Methods in Economics & Finance Chair(s): <i>Mercedes Pérez de la Porte, La Rioja University</i> IBM_31: The role of simulation as a method for sales forecasting – A systematic literature review <i>Tobias Johannes Klime, Marius Rabe and Michael Toth</i>	

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- IBM_80: Kanban as a precursor for JIT: one-piece flow and economic performance <i>Roberto Díaz Reza, Jorge Luis García Alcaraz, Yashar Aryanfar, Mercedes Pérez de la Porte and Ali Neşebay</i> - IBM_106: A Distributed Real-Time Multi-Agent Stock Exchange Simulator for Investigating Inter-Market Arbitrage <i>Artur Varasjan and Dave Cliff</i> - IBM_84: Feasibility Test of A Hybrid Simulation Approach for Optimized Resource Allocation and Cash Flow Management <i>Mohammadsohegh Shahrkishahzaki, Mohammad Rezaeizadani, Hamidreza Golabchi, Yasser Mohamed and Gang Lee</i>

2:00 pm – 3:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Room 2.2, Escuela Superior de Ingeniería y Tecnología, Floor 1	Wed 18th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS-HMS-ESDE: Modeling & Simulation for Inventory Management Chair(s): <i>Emilio Jimenez, La Rioja University</i> - IBM_83: Comparison of structural typologies in industrial warehouses <i>Jorge Fernández-Zarzosa, Javier Ferrero-Caballo, Esteban Fraile-García, Emilio Jimenez Macías and Jorge Los Santos-Ortega</i> - IBM_107: Dynamic transport-iot assignment for the hot-storage area <i>Sebastian Leitner, Philipp Fleck, Stefan Wagner and Michael Affenzeller</i> - IBM_83: Random vs Class-based allocation policies: impact of the warehouse parameters on the distance traveled by pickers <i>Claudio Suppini, Natalya Lysova, Federico Solari, Letizia Tabaldi, Alessandro Carioni and Roberto Montanari</i> - IBM_113: Configuration of an automated storage and retrieval system via simulation <i>Anarita De Maio, Francesco Longo, Roberto Musumanno and Pierpaolo Vairi</i> - IBM_153: Sustainability in Warehouse Design and Management by using Building Information Modeling & Simulation <i>Agostino G. Bruzzone, Antonio Giovannetti, Elia Pazzaglia, Stefano Bottino, Yarnar Rokhmabardi and Luca Solfa</i>	

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2:00 pm – 3:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Room 2.6, Escuela Superior de Ingeniería y Tecnología, Floor 1	Wed 18th, 2024
Microsoft Teams, Session Link: Access the Online Session	
HWISH: Novel Approaches for Healthcare Applications (Part I) Chair(s): <i>Marco Prazzoli, University of Genoa</i> - IBM_6: 3D printed models of the major congenital heart defects: integration into the training of nursing students <i>Katharine Morrison, Tracy Lakin, Haley Hoy, Delaney Enlow, Kevin Hernandez, Gary Maddux and Bernard Schroer</i> - IBM_7: Step-up approach in trauma surgery training: a pilot course <i>Federica Renzi, Michele Altomare and Ovidio Chiara</i> - IBM_4: Achieving realism in women's health simulation with silicone rubber labia majora augmented with an anatomically correct uterus: An enhanced training experience for nursing students <i>Daniela Showalter, Jarmel Poole, Haley Hoy, Kevin Hernandez, Delaney Enlow, Cooper Gunter, Gary Maddux and Bernard Schroer</i> - IBM_5: Low-cost female catheterization simulator for increasing anatomical accuracy and clinical competency of insertion <i>Daniela Showalter, Haley Hoy, Kevin Hernandez, Cooper Gunter, Delaney Enlow, Gary Maddux and Bernard Schroer</i>	

3:30 pm – 4:00 pm Tenerife Local Time, WEST
Coffee Break

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4:00 pm – 5:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Salón de Grados de la Escuela Superior de Ingeniería y Tecnología, Floor 2	Wed 18th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS-MAS: Innovative Digital Twins and Simulation-Based Approaches Chair(s): <i>Adriano Solis, York University</i> - IBM_90: The coexistence of commercial and open-source simulation solutions in the Digital Twin era <i>Denise Borges, Luis Diaz, Marcelo Henriquez and Ricardo Mochado</i> - IBM_49: Safeguarding Critical Infrastructures with Digital Twins and AI <i>Andrea Tundis and Oscar H. Ramirez-Agudelo</i> - IBM_35: Artificial Intelligence and Digital Twin for Effective Risk Management in an experimental plant <i>Ilaria Pietrangeli, Giovanni Mazzuto, Filippo Emanuele Ciarpiccia and Maurizio Bevilacqua</i> - IBM_73: Digital Twins in Action: Optimizing Fuzhai Through Simulation and Modeling <i>Matevž Bolnak, Goran Andonovski and Igor Škrjanc</i> - IBM_139: Enhancing Simulation Capabilities Through the Integration of Discrete Event Simulation and Virtual Reality <i>Joseph Jabbour, Jalal Possik, Charles Yacoub, Sina Namaki Araghi, Simon Gorecki, Gregory Zacharewicz, Adriano O. Solis</i>	

4:00 pm – 5:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Room 1.4, Escuela Superior de Ingeniería y Tecnología, Floor 0	Wed 18th, 2024
Microsoft Teams, Session Link: Access the Online Session	
DHSS: New Methods for Defense and Homeland Security Chair(s): <i>Agostino Bruzzone, University of Genoa</i> IBM_23: H-Verify: Automating Intrusions through Digital Twins <i>Emilio Panti, Lorenzo Isani and Fabrizio Balzani</i>	

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> IBM_43: Synthetic threat Dataset Generation by UAV fleet Simulation <i>Genaro Pla Rimol, Francesco Palmieri and Massimo Fico</i> > IBM_44: Modelling the Promotion of Warriors' Resistance to Information Warfare Threats through Fuzzy DEMATEL with Trapezoidal Structure <i>Svajone Belesiene</i> > IBM_131: Enhancing Defense Threat Assessment through Segmentation and Labelling of Synthetic Data <i>Agostino Bruzzone, Umberto Battista, Carolina Badano, Federico Taddei Santoni</i> > IBM_132: Leveraging Synthetic Data Generation for Military Decision Support Enhancement <i>Agostino Bruzzone, Umberto Battista, Carolina Badano, Federico Taddei Santoni</i>
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4:00 pm – 5:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 2.2, Escuela Superior de Ingeniería y Tecnología, Floor 1 Microsoft Teams, Session Link: Access the Online Session IIWISH: Novel Approaches for Healthcare Applications (Part II) <i>Chair(s): Marco Frasca, University of Genoa</i> > IBM_18: Mathematical Modeling of Behavior-Induced Body Weight Changes <i>Martina Chudong, Pitchaporn Paitong and Andrea De Gaetano</i> > IBM_19: Simulating Brain Gradient-Echo Magnetic Resonance Images through Microstructural Modeling <i>Mert Siman, Alexandra Roberts, Hongwei Zhuang, Ranjiu Hu, Junghun Cho, Shun Zhang, Pascal Spincemille, Thanh Nguyen and Yi Wang</i> > IBM_41: Collaboration error as loss function in binary classification <i>Stephan Dreiseitl</i> > IBM_60: A numerical model to investigate sorts coarsening <i>Gionata Fragoneri, Patricia Viza, Amigo Palumbo and Vero Gramigna</i>	Wed 18th, 2024
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4:00 pm – 5:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 2.6, Escuela Superior de Ingeniería y Tecnología, Floor 1 Microsoft Teams, Session Link: Access the Online Session SMALLDERS General Assembly <i>Chair(s): Francesco Longo, University of Calabria</i> This session is reserved for SMALLDERS project consortium members only. The project is carried out by a consortium of 5 partners including University of Calabria (Italy), University of Parma (Italy), IMT Mines Ales (France), Extremadura University (Spain) and University of Tunis (Tunisia). The overall objective of the SMALLDERS project is to carry out basic research as well as industrial research and development activities with the aim of identifying a framework that involves innovative strategies, methodologies, technologies and business models to increase the resilience of small-scale farms in the Mediterranean area, to effectively and efficiently face unexpected and disruptive events such as the COVID-19 pandemic.	Wed 18th, 2024
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ISM 2024

Activities and Sessions Details

Thursday, September 19th

9:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Salón de Grados de la Escuela Superior de Ingeniería y Tecnología, Floor 2 Microsoft Teams, Session Link: Access the Online Session FOODOPS: Innovative Solutions in the Agri-Food Sector (Part I) <i>Chair(s): Giuseppe Vignoli, University of Parma</i> > IBM_110: CoAP-based Digital Twin Modelling of Heterogeneous IoT Scenarios <i>Lucia Davoli, Hafa Humza Mahmood Ramzan, Laura Belli and Gianluigi Ferrari</i> > IBM_38: A Conceptual Framework for Predictive Digital Dairy Twins: Integrating Explainable AI and Hybrid Modeling <i>Dana Jox, Darius Hummel, Jörg Hinrichs and Christian Krupitzer</i> > IBM_63: Defining a Cognitive Digital Twin architecture in food supply chains: the early outcomes of DSS4LCO initiative <i>Gabriele Pasetti Monizza, Maryam Mozaffari, Simone Fabbri, Johann Gampfer, Oswald Lanz and Dominik Matt</i> > IBM_65: Artificial intelligence-based soil moisture estimation using a combination of in-situ measurements and open-source data <i>Luca Preite, Arianna Pini and Giuseppe Vignoli</i> > IBM_148: Optimization based on Innovative Models for Online Food Delivery and Supply Chain Management <i>Agostino G. Bruzzone, Giovanni Maria Ferraris and Fabio Ferraro</i>	Thu 19th, 2024
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9:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 1.4, Escuela Superior de Ingeniería y Tecnología, Floor 0 Microsoft Teams, Session Link: Access the Online Session HMS: Recent Advances in the Maritime Sector <i>Chair(s): Eleonora Bottani, University of Parma</i> > IBM_92: Threatmap: A Framework for Enhancing Security Awareness and Decision-Making for Naval Agents <i>Md Abu Sayed, Mayamin Hamid Raha, Parvaneh Aliniya, Monica Nicolae and Mircea Nicolae</i> > IBM_133: Enhancing Maritime Training: The Role of VR in Ship Bridge Simulators - The CAL-TEK Case Study <i>Virginia D'Augusta, Francesco Longo, Karen Althea Manfredi, Giovanni Mirabelli, Letizia Nicolletti, Vittorio Solina, Simone Talarico</i> > IBM_86: Ship route planning in simulation models of Arctic transport systems <i>Alex Topaj and Oleg Tarovik</i> > IBM_98: How to identify ground slot patterns in inland terminals to increase storage capacity of containers - a combination of metaheuristic and simulation <i>Jana Voegl, Pavel Cimili, Patrick Hirsch and Manfred Gronalt</i> > IBM_149: Scenario Simulation to Investigate new Solutions for Port Terminals and Plants based on Intelligent Data Fusion and Supply Chain Modeling <i>Agostino G. Bruzzone, Anna Sciomachen, Marco Gotelli, Antonio Giovannetti, Alessia Giulianetti, Parshad Shamiu</i>	Thu 19th, 2024
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9:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.6, Escuela Superior de Ingeniería y Tecnología, Floor 2 Microsoft Teams, Session Link: Access the Online Session	Thu 19th, 2024
SESEDE-MAS: Electric Solutions for a Sustainable Future Chair(s): Antonio Padovano, University of Calabria	
> IBM_51: A high-level model of electric isolated systems to assess energy transition planning Iván Castilla Rodríguez, Alfredo Ramírez Díaz, Juan Albino Méndez Pérez, Francisco Javier Ramos Real, Oscar García Alfonso, Benjamin González Díaz, José Francisco Gómez González, Francisco Javier Colazo García, Israel Riverón Miranda and Vivek Vinod Balan-Mastani > IBM_72: An optimization model for the charging infrastructure of electric vehicles incorporating the topography: a case study for the island of Tenerife Alejandro Rojano-Padron, Iván Castilla Rodríguez and Francisco J. Ramos-Real > IBM_138: A Decision Support System for End-of-Life Management of Electric Vehicle Batteries: A Framework Addressing Disassembly Complexities Martina Cardamone, Vincenzo Carrilli, Francesco Longo, Antonio Padovano, Felice Tauro > IBM_20: ECO-CHARGE: Sustainable Decision Making for EV Charging Station Production Pablo De Felice, Cristina De Luca, Analiz Gul Fareed, Veronica Campanile and Antonella Petrucci > IBM_25: A review on current trends on optimal EVCS location Silvia Carpitella, Kudong Jia and Rasoul Norimani	

9:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.7, Escuela Superior de Ingeniería y Tecnología, Floor 2 Microsoft Teams, Session Link: Access the Online Session	Thu 19th, 2024
EWISH: Novel Solutions in the Healthcare Sector Chair(s): Marco Frazzoli, University of Genoa	
> IBM_32: Optimizing Pharmaceutical Supply Chain Configuration in Primary Healthcare: A Mathematical Modeling and Decision Support Approach Manal Alzaidan, Majed Hadid, Ragina Padmanabhan and Laoucine Kerboche	

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> IBM_74: Stochastic modeling of glioblastoma spread: a numerical simulation study Alessandro Borri, Massimiliano D'Angelo, Laura D'Orsi, Marcello Pompa, Simona Panunzi and Andrea De Gaetano > IBM_102: Molecular docking of triazole-based ligands with KDM5A to identify potential inhibitors Jose Sigüenza and Hacı Baykara > IBM_103: Gait Evaluation for Prevention and Rehabilitation based on Dynamic Time-Warping and Acceleration Measurement Jan Beckmann and Volkhard Klinger > IBM_111: Visualization of Patient Progress Monitoring and Vital Signs Trends in Electronic Nursing Reports Barbara Tranter, Clara Diezennreiter and Oliver Krauss

10:30 am – 11:00 am Tenerife Local Time, WEST
Coffee Break

11:00 am – 12:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Salón de Grados de la Escuela Superior de Ingeniería y Tecnología, Floor 2 Microsoft Teams, Session Link: Access the Online Session	Thu 19th, 2024
EMSS-SESEDE-MAS: Recent Challenges in the Energy Sector Chair(s): Emilio Jimenez, La Rioja University	
> IBM_17: Operationalising justice in models used as decision-support tools in local and regional energy transition planning Aarshi Meenakshi Sundaram, Yilin Huang, Eefje Cuppen and Igor Nikolic > IBM_93: Designing a low-energy fiber-optic interconnect link of terabyte throughput for hyper-scale Data Centers Mikhail Belkin, Evgeny Plastinin and Nikita Smirnov > IBM_81: A comparative study of a geothermal double flash cycle equipped with a carbon dioxide transcritical cycle for different well inlet temperatures Yashar Aryanfar, Jorge Luis García Alcaraz, Emilio Jiménez Macías and Ali Keçrebas	

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> IBM_15: Towards a multi-model infrastructure for integrated decision-making in energy transition Yilin Huang and Igor Nikolic > IBM_67: Impact of cost perception and environmental concern on environmental attitudes toward green energy Ingrid Iovana Burgos Espinoza, José Roberto Díaz Reza, Jorge Luis García Alcaraz and Emilio Jimenez Macias
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11:00 am – 12:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 1.4, Escuela Superior de Ingeniería y Tecnología, Floor 0 Microsoft Teams, Session Link: Access the Online Session	Thu 19th, 2024
EMSS-SESEDE-HMS: Sustainable and Efficient Approaches in Aviation Chair(s): Iván Castilla Rodríguez, University of La Laguna	
> IBM_41: The role of digital twins in shaping aviation's circular economy transformation Akram Pottan, Moshura Bhandigoni, Silvia Carpitella and Sepideh Abolghasem > IBM_87: Modeling the implementation of technology in a passenger security screening checkpoint at Amsterdam Airport Schiphol Sersinho Garat, Catya Zuniga and Ann Wellens > IBM_71: Towards a digital twin of the PRM service in airports based on semantic tools Juan José Herrera-Martín, Iván Castilla-Rodríguez, Christian Torres-González, Rafael Armay and Gonzalo Costa > IBM_68: Topology Effects in Drone Parcel Delivery Irene Izco Berastegui, Adrian Serrano-Hernandez and Javier Faulin Fajardo > IBM_40: Verification of Sensing Drone Stochastic Control Theory Algorithms John Richardson, Don Tran and Christopher Lorenzen	

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11:00 am – 12:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.6, Escuela Superior de Ingeniería y Tecnología, Floor 2 Microsoft Teams, Session Link: Access the Online Session	Thu 19th, 2024
Special Session: PRIMA Projects Chair(s): Francesco Longo and Vittorio Solina, University of Calabria	
> GREEN DRIED FRUITS Project Elisa De Marchi, University of Milan, Italy > TECHONEY Project Tiziana De Magistris, Agrifood Research and Technology Centre of Aragon, Spain > CERERE Project Antonio Padovano, University of Calabria, Italy > SMALLDERS Project Francesco Longo and Vittorio Solina, University of Calabria, Italy	

11:00 am – 12:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.7, Escuela Superior de Ingeniería y Tecnología, Floor 2 Microsoft Teams, Session Link: Access the Online Session	Thu 19th, 2024
Special Session: Eurosism Board Meeting Chair(s): Agostino Bruzzone, University of Genoa	
This session is aimed at discussing the upcoming activities of the Eurosism Society.	
EUROSIM - the Federation of European Simulation Societies, provides a European forum for regional and national simulation societies to promote the advancement of modeling and simulation in industry, research and development. Under the EUROSIM umbrella, EUROSIM Member Societies and co-operating societies and groups organise conferences, produce publications on modelling and simulation, work in standardising or technical committees.	

12:30 pm – 2:00 pm Tenerife Local Time, WEST
Lunch Break

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2:00 pm – 3:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Salón de Grados de la Escuela Superior de Ingeniería y Tecnología, Floor 2	Thu 19th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS-MAS: Finance, Business Processes and Project Management Chair(s): Antonio Cimino, University of Salerno and Vittorio Solina, University of Calabria - IBM_9: Transformation of BPMN models of business processes into models using colored Petri nets David Le and Antonin Kavicka - IBM_84: Simulation of Social Media-Driven Bubble Formation in Financial Markets using an Agent-Based Model with Hierarchical Influence Network Gonzalo Bohorquez and John Cartledge - IBM_42: Modelling of efficient project portfolios Petr Fiala and Renata Majovska - IBM_75: Dynamic and risk multicriteria analyses of project portfolios Renata Majovska and Petr Fiala	

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- IBM_28: Radio Frequency Identification in the Food Industry: Preliminary results from a biometric analysis on case studies Letizia Tebaldi, Andrea Volpi, Claudio Suppini, Natalya Lysova, Roberto Montanari and Eleonora Bottani - IBM_62: Life Cycle Assessment of pelletized compost from agricultural waste valorization processes Arianna Pini, Luca Freite and Giuseppe Vignoli - IBM_95: Mitigating Design Errors in Standardized Food Processing Plants: Insights from CFD Simulation of a Tomato Concentration Process Federico Salari, Natalya Lysova, Alex Dalia Floria, Andrea Volpi, Antonio Rizzi and Roberto Montanari

2:00 pm – 3:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Room 3.6, Escuela Superior de Ingeniería y Tecnología, Floor 2	Thu 19th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS-MAS: Simulation and Optimization for Industrial Applications Chair(s): Adriano Solis, York University - IBM_100: Convergence Analysis of Genetic Algorithms on Dynamic Production Scheduling Michael Heckmann, Bernhard Wirth and Stefan Wagner - IBM_89: Aggregated evaluation of production flows Ivo Formánek, David Kruml and Jan Paseka - IBM_135: Towards Real-Time Task Allocation in Human-Robot Collaboration: Defining Key Requirements and Features for a Multi-Simulation Digital Twin System Alessio Boratto, Antonio Cimino, Alessandro Chirco, Francesco Longo, Giovanni Mirabelli, Letizia Nicoletti - IBM_137: Exploring the Impact of Emotional States on Human Performance in Production Systems: A Simulation Approach Manuel Campanella, Antonio Cimino, Antonio Padovano, Vittorio Solina and Adriano O. Solis	

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2:00 pm – 3:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Room 3.7, Escuela Superior de Ingeniería y Tecnología, Floor 2	Thu 19th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS-IWISH: New Technologies and Approaches in the Healthcare Sector Chair(s): Marco Frascio, University of Genoa - IBM_22: Enhancing Surgical Training in Italy: Proposing a Standardized Multidisciplinary Curriculum for Residency Programs. A four years experience of the SPIBC-AIMS working group. Domenico Soriero, Giacomo Pugliese, Marco Amisano, Davide Pertile, Alessandro Pasculli, Beatrice Sperotto, Luigi Losco, Michele Maruccia, Roberto Manicani, Francesco Rotti, Matteo Selenari, Giuseppe Vizzielli, Stefano Restaino, Marco Frascio et al. - IBM_112: Emerging Technologies for Data-Driven Pharmaceutical Supply Chain Management Galina Markurjeva - IBM_2: Identifying and addressing disruptions in healthcare supply chain management Puravkumar Patel, Smitesh Shah, Silvia Corpitella and Sepideh Abolghasem - IBM_134: Integration of Industry 4.0 Technologies for Enhancing Healthcare Efficiency and Patient Care: A Comprehensive Literature Review Martina Cardamone, Antonio Cimino, Virginia D'Augusta, Antonio Nervoso, Antonio Padovano, Simone Talarico	

3:30 pm – 4:00 pm Tenerife Local Time, WEST Coffee Break

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4:00 pm – 5:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Salón de Grados de la Escuela Superior de Ingeniería y Tecnología, Floor 2	Thu 19th, 2024
Microsoft Teams, Session Link: Access the Online Session	
HMS: Innovative and Sustainable Approaches for Logistics Chair(s): Eleonora Bottani, University of Parma - IBM_8: Exploring the maturity of Discrete-event simulation in logistics: is this a new research domain? Eleonora Bottani and Giorgio Casella - IBM_66: Application of Machine Learning for 3D Localization using RFID-Tag RSSI Values in Logistics Environments Lukas Rasmann, Jakob Wittmann, Corinna Huber and Sebastian Meisner - IBM_96: Analysis of interrelationships among key factors of smart urban logistics and urban access management: a system dynamics-based model Gaetano Rubino, Domenico Gattuso and Manfred Gronalt - IBM_32: Process mapping and KPIs modelling for a manufacturing company Martina Bresadola and Eleonora Bottani - IBM_114: Evaluating Supply Chain Performance Through Lean, Agile, Resilient, and Green (LARG) Perspectives: A Comprehensive Framework Eleonora Bottani, Laura Monfardini, Giorgio Casella and Cristina Mora	

4:00 pm – 5:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Room 1.4, Escuela Superior de Ingeniería y Tecnología, Floor 0	Thu 19th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS: Advanced Modeling and Simulation Chair(s): Juan Albino Mendez Perez, University of La Laguna IBM_10: Credibility Metric Weighting for Accelerating Qualitative Model Evaluation Ke Hu, Jialai Gong, Jialy Zhang, Bijun Tang, Yuanjun Lai, Lin Zhang and Lei Fan	

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> I3M_12: Tianshu: Towards Accurate Measuring, Modeling and Simulation of Deep Neural Networks <i>Hongming Huang, Hong Xu and Nan Guan</i> > I3M_56: Easy Communication Environment for Heterogeneous and Distributed Simulation Models Design <i>Artis Alastruats and Egils Ginters</i> > I3M_59: Never Mind The No-Ops: A Faster Simulation Algorithm For Modeling Co-Evolutionary Species Interactions via Spatial Cyclic Games <i>Dave Cliff</i> > I3M_70: Pipeline Representation Using Generic Parallel Algorithms in Heterogeneous Parallel Computing. A comparative analysis <i>María Rossainz-López, Barbara Sanchez-Rinza, Zuriel López-Sosa and Manuel I. Capel-Tuñón</i>

4:00 pm – 5:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.6, Escuela Superior de Ingeniería y Tecnología. Floor 2 Microsoft Teams, Session Link: Access the Online Session EMSS-MAS: Traffic, Mobility and Emergency Management Chair(s): Marina Massai, University of Genoa > I3M_39: Scenario Modeling for the Virtual Validation and Verification of Cloud-based Mobility Services <i>Philipp Heisig and Sabine Sachweh</i> > I3M_104: Hybrid toll plaza capacity: Simulation modeling of traffic <i>Alexander Tolavirya and Mikhail Laskin</i> > I3M_105: Integrating Flood Maps into Agent-Based Modeling for Participatory Management <i>Chaiyapong Kesamoon and Prachya Boonprasurt</i> > I3M_24: Towards Modelling Human Behaviour and Warning Message Informativity in Large-Scale Event Evacuation <i>Amelie Schmidt-Colberg, Sophie Teiglic, Ruth Meyer and Antonio Kruse</i>	Thu 19th, 2024
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4:00 pm – 5:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.7, Escuela Superior de Ingeniería y Tecnología. Floor 2 Microsoft Teams, Session Link: Access the Online Session 4:00 pm – 4:45 pm Tenerife Local Time, WEST Special Session: I3M 2025 and MISS/MSNet Board of Directors Meeting Chair(s): Agostino Bruzzone, University of Genoa and Claudia Frydman, LISIS This Special Session is an opportunity to meet colleagues from different Universities and countries and to join a completely open discussion about the organization of the I3M 2025 edition. As the discussion will be completely open, there are no predefined speakers and there is no need to prepare specific power point presentations. During the session, each attendee will be invited to introduce herself/himself and her/his affiliation as well as to discuss about opportunities to set-up new tracks and special sessions and/or join the I3M International Program Committee. New ideas to improve the conference organization are also welcome. The session will also host the traditional MISS and MSNet Annual Directors Meeting. 4:45 pm – 5:30 pm Tenerife Local Time, WEST Special Session: Strategic Engineering PhD and STRATEGOS Chair: Prof. Agostino G. Bruzzone, University of Genoa This special session is devoted to present the Strategic Engineering PhD Program and the new Master's Degree Program in Strategic Engineering (STRATEGOS) at University of Genoa, Italy. All the attendees are invited to join to know more about these interesting opportunities and to set-up new collaboration within the framework of the Strategic Engineering PhD Program and STRATEGOS Master's Degree Program.	Thu 19th, 2024
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I3M 2024 Awards Ceremony

The I3M 2024 Awards will be delivered during the Gala Dinner on September 19th, 2024

I3M 2024

Activities and Sessions Details

Friday, September 20th

8:30 pm – 11:00 pm Tenerife Local Time, WEST In presence La Laguna Gran Hotel, C. Nova y Grimen, 18, 38201 La Laguna, Santa Cruz de Tenerife, Spain I3M Awards Ceremony I3M Best Paper Awards The I3M 2024 Best Paper Award is assigned by the I3M 2024 Best Paper Award International Committee and selected among the top-quality papers presented at I3M based on originality, scientific quality and impact on the manufacturing domain. Gianni Cantice Award for Gifted Simulation Students The "Gianni Cantice Research Award for Gifted Simulation Students" will be announced during the I3M Awards Ceremony and attributed to the best simulation student applicants. The Award is entitled to Col. Cantice as recognition for his long activity in Simulation; the Gianni Cantice Award Winner will receive the Award Certificate and a free registration to the next I3M conference. Further information at www.i3mconf.org/i3m/cantice Norbert Giambiasi Award The Norbert Giambiasi Award is entitled to Prof. Norbert Giambiasi as recognition for very highly qualified contribution in Conceptual Modeling and DEVs within International Simulation Community. The Norbert Giambiasi Award Certificate Board selects the paper among best Conceptual Modeling contributions to I3M Conference.	Thu 19 th , 2024
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9:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Salón de Grados de la Escuela Superior de Ingeniería y Tecnología, Floor 2 Microsoft Teams, Session Link: Access the Online Session EMSS: Innovative Simulation Models and Mathematical Paradigms Chair(s): Roberto Musmanno and Annarita De Maio, University of Calabria > I3M_115: Impact of Pretraining Datasets on Point-MAE Performance in Point Cloud Classification <i>Rita Younes, Roy Abi Zeid Daou, Grace El Khoury, Jalal Possik and Charles Yaacoub</i> > I3M_108: Evolutionary Hyperparameter Tuning in MLNET <i>Philipp Neuhauser and Stefan Wagner</i> > I3M_101: Tournament versus Circulant: On Simulating T-Species Evolutionary Spatial Cyclic Games with Abilised Predator-Prey Networks as Models of Biodiversity <i>Dave Cliff</i> > I3M_88: SimLuxJS – an optimized JavaScript-simulator <i>Thomas Wiedemann and Michael Danzig</i> > I3M_91: Modeling reliability constraints in modern Optical Network Simulation Environments <i>Francesco Palmieri and Fico Massimo</i>	Fri 20th, 2024
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9:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 2.6, Escuela Superior de Ingeniería y Tecnología, Floor 1	Fri 20th, 2024
Microsoft Teams, Session Link: Access the Online Session	
MAS-DHSS-FOODOPS: Simulation and Sustainable Supply Chains Chair(s): Ivan Castilla Rodríguez, University of La Laguna > I3M_35: Supply Chains modelling with Agent Based Simulation: a methodological exploration of agent types and their interactions Francesco Zammit, Francesco Moroni and Alessandro Viola > I3M_36: Assessing the Effect of Citizens' Behaviour in Textile Waste Separate Collection: An Agent-based Simulation Model Nicola Mercogliano, Francesco Zammit, Giovanni Romagnoli and Davide Castellano > I3M_37: Assessing Agri-food supply chain multi-capital sustainability using Simple Multi-Attribute Rating Technique: the policy maker case study Safa Chabouh, Lila Sidhom, Ala Zammit and Abdel Kader Mami > I3M_46: Pharmaceutical Logistics under Cyberattack Conditions Larissa Schochenhofer and Patrick Hirsch > I3M_37: Modeling impact damage to fruit during harvest and postharvest processing Faizallah Shahbazi	

9:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.6, Escuela Superior de Ingeniería y Tecnología, Floor 2	Fri 20th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS-SEDE: Advanced Paradigms for Simulation & Optimization Chair(s): Mohamad Elbassher, University of Calabria and Anaiz Gul Fared, Parthenope University of Naples > I3M_13: Simulation of smoke optical density in road tunnel by two tunnel models for FDS Peter Waispacher, Jan Glasa and Lukas Volasek > I3M_16: Comparison of ECDSA Signature Verification Implementations on Bare-Metal Embedded Systems Philipp Holzer, Franz Leopold Wiesinger and Michael Bogner	

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> I3M_50: Optimization of Implantation and Diffusion Parameters to Minimize the Point Defects Formation in Textured Thin Film Solar Cells Abderrazak El Boukili > I3M_77: Efficient Global Optimization for Dynamic Problems Bernhard Wierth, Johannes Karder, Stefan Wagner and Michael Affenzeller > I3M_146: Innovative Solutions for Modeling Human Behavior in Buildings and Construction Sites Agostino Bruzzone, Giovanni Maria Ferraris, Kirill Sinezhnikov, Luca Bucchianci, Pier Filippo Monaci, Luca Torano, Antonio Martella, Massimo Pademonte
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9:00 am – 10:30 am Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.7, Escuela Superior de Ingeniería y Tecnología, Floor 2	Fri 20th, 2024
Microsoft Teams, Session Link: Access the Online Session	
DHSS: Innovative Simulation Solutions for Defense and Homeland Security Chair(s): Agostino Bruzzone, University of Genoa > I3M_140: An Audacious Wargame on Critical Infrastructures based on LLMs and Simulation over Physical, Cyber & Cognitive Actions Agostino G. Bruzzone, Antonio Giovannetti, Luca Cirillo, Marco Gotelli, Filippo Ghisi > I3M_141: Constructive wargaming simulation as a critical component of the tactical swarm configuration optimization Jan Mazal, Roman Adamek, Pham Huy Dang, Agostino Bruzzone, Jaroslav Hrdina, Petr Vasek > I3M_142: Tactical behavior optimization for a UGV teams Jan Mazal, Jaroslav Hrdina, Petr Vasek, Roman Adamek, Jiri Pihlak, Dalibor Prochazka, Ivan Ergasov > I3M_143: Blockchain for Secure Railway Signal Communication & Protection of Critical Infrastructures Agostino Bruzzone, Antonio Giovannetti, Siddhi Rajendra Gangar, Lorenzo Motta > I3M_144: Strategic Engineering to support Decision Makers in Complex Systems: Innovative Models for Cognitive Warfare Simulation Agostino Bruzzone, Antonio Giovannetti, Marco Gotelli, Jan Hodyck, Marina Massei, Alberto De Paoli, Roberto Ferrar, Filippo Ghisi	

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10:30 am – 11:00 am Tenerife Local Time, WEST Coffee Break	
11:00 am – 12:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Salón de Grados de la Escuela Superior de Ingeniería y Tecnología, Floor 2	Fri 20th, 2024
Microsoft Teams, Session Link: Access the Online Session	
MAS-EMSS-SEDE: Simulation and Artificial Intelligence for Novel Applications Chair(s): Claudia Frydman, LIS and Vittorio Salina, University of Calabria > I3M_14: Where are the arithmetic capabilities of a large language model located? Andreas Stöckl and Oliver Krauss > I3M_61: Enhancing Photorealism of Physically Accurate 3D Simulated Images Using GANs Veronica Campana, Jorge Jimenez, Jürgen Rößmann and Ruggero Carlì > I3M_70: Pedestrians' urban thermal comfort: A machine learning assessment through transect walks José-Antonio Rodríguez-Gallego, Eduardo Díaz-Mellado, Tomás Chacón Rebollo, Carmen Galán-Marín and Carlos Rivera-Gomez > I3M_130: Explaining LSTM neural networks: A DEV5-based approach Ali Ayadi, Thi-My-Duyen Truong, Claudia Frydman, Cédric Wemmer > I3M_136: Leveraging ML for On-Site Bubble Point Pressure Prediction in Sudanese Crude Oil: A Resilient Approach During Conflict Mohamad Elbassher, Hassan Suliman, Catarina Fusto, Giovanni Mirabelli, Antonio Padovano, Vittorio Salina	

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11:00 am – 12:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 2.6, Escuela Superior de Ingeniería y Tecnología, Floor 1	Fri 20th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS-SEDE-MAS: Sustainability-oriented solutions in the industrial and urban sectors Chair(s): Emilio Jimenez, La Rioja University > I3M_29: Assessing the Environmental Impact of Steel and the presence of Critical Raw Materials: an Improved Tool for Industry Isabel García Gutiérrez, Patricia Orquín Granada, Carlos Javierre and Daniel Elduque > I3M_30: Strategies based on ecodesign to improve sustainability in molded products Ángel Fernández, Isabel Cloveria and Patricia Orquín > I3M_62: Environmental assessment of a structural element in a residential building Jorge Los Santos-Ortega, Jorge Fernández-Zorzano, Esteban Fraile-García, Javier Ferreira-Cobello and Emilio Jimenez Macias > I3M_109: An overview of CFD simulation plug-ins within the BIM environment for urban microclimate analysis Lucia Campos-Rosa, Carlos Rivera-Gomez, Carmen Galán-Marín and Jesus Lizana > I3M_151: Generative AI and Retrieval-Augmented Generation (RAG) in an Agent-Based Simulation Framework for Urban Planning Agostino Bruzzone, Antonio Giovannetti, Giacomo Genta, Daniele Cefalillo	

11:00 am – 12:30 pm Tenerife Local Time, WEST University of La Laguna (Tenerife) Room 3.6, Escuela Superior de Ingeniería y Tecnología, Floor 2	Fri 20th, 2024
Microsoft Teams, Session Link: Access the Online Session	
EMSS-MAS-SEDE: Novel Solutions based on Simulation and AI Chair(s): Ivan Castilla Rodríguez, University of La Laguna > I3M_145: Innovative Extended Reality and Simulation-based Training for Control Room Operators in Industry Agostino Bruzzone, Kirill Sinezhnikov, Marina Massei, Luca Cirillo, Xhulia Sina, Filippo Ghisi, Roberto Ferrar, Giovanni Ferraris Marina Cardelli, Bharath Gadupuri, Javed Karim, Pooriya Azadegan	

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> IBM_147: Modeling & Simulation for an Investigation Process to support Decision Making in a Non-Ordinary Context Agostino Bruzzone, Giovanni Maria Ferraro, Antonio Giovannetti, Marco Gotsali > IBM_150: Innovative Modeling of Deep Fake Dynamics on the Population by using Artificial Neural Network Agostino G. Bruzzone, Antonio Giovannetti, Luca Cirillo, Filippo Ghisai, Simone Gleason Ferraro > IBM_152: Innovative Framework based on Simulation and Generative AI for enhance Decision Making in Green Projects Agostino G. Bruzzone, Antonio Giovannetti, Luca Cirillo, Khulfa Sina, Filippo Ghisai, Simone Gleason Ferraro > IBM_154: Stress-Driven Simulation model in Polar Coordinates: The Analytical case for Circular Plates Roberto Ciani, Agostino Bruzzone, Roberto Sturlati, Mohammadreza Jafarinasad
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11:00 am – 12:30 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> Room 3.7, Escuela Superior de Ingeniería y Tecnología. Floor 2 Microsoft Teams, Session Link: Access the Online Session Special Session: LOLLIPOP, ISTEEL, EULEP Projects Chair(s): Agostino Bruzzone, University of Genoa This special session is aimed at discussing the main goals and results of the following projects: • Lollipop • Isteel • Eulep	Fri 20th, 2024
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12:30 pm – 2:00 pm Tenerife Local Time, WEST <u>University of La Laguna (Tenerife)</u> (During Luncheon) Only in Presence IBM 2024 Closing Ceremony Chair: Agostino Bruzzone, University of Genoa, Italy; Francesco Longo, University of Calabria, Italy. All "in presence" attendees are invited to join the IBM 2024 Closing Ceremony. The Closing Ceremony is a nice opportunity to wrap-up the conference experience and to say hello each other waiting for the next IBM edition (2025).	Fri 20th, 2024
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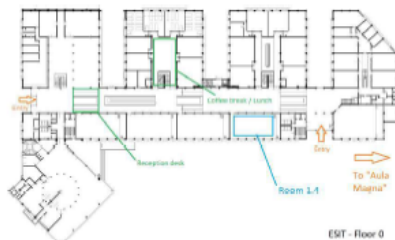
38

Locations

Location of Conference Sessions and Gala Dinner

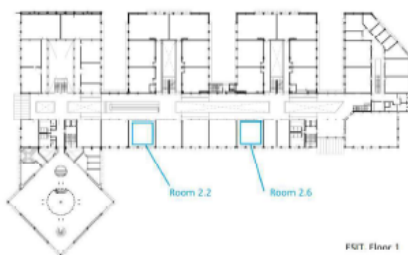
Locations of conference events

Escuela Superior de Ingeniería y Tecnología (ESIT) – Floor 0



ESIT - Floor 0

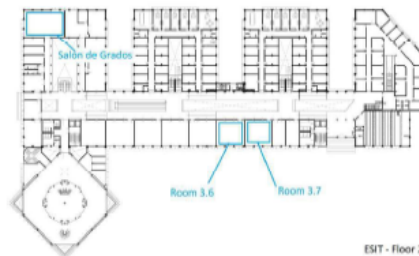
Escuela Superior de Ingeniería y Tecnología (ESIT) – Floor 1



ESIT - Floor 1

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Escuela Superior de Ingeniería y Tecnología (ESIT) – Floor 2



ESIT - Floor 2

Escuela Superior de Ingeniería y Tecnología Facultad de Física y Matemáticas



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Event information	
Event name (and acronym)	Annual Modeling and Simulation Conference (ANNSIM 2025)
Type of event	Conference (Scientific Event)
Date	May 26-29, 2025
Location	Madrid, Spain
Geographic coverage	Europe, Morocco, Tunisia
Type of audience	Modelling and Simulation experts, PhD students, Industry
Approximate size of audience	Approximately 120 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	Towards Federating IoT and Simulation Systems: an HLA-Based Approach
Presenter	Michel El Haddad (UNICL)
Other partners involved	UNIRIO
Hashtag(s) for Social Media	#steel #training #digitalisation #EAF
Attachments (e.g. agenda, invitation)	Program



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Previous Editions: ANNSIM 2025 and Complutense University are not responsible for any damage to the Internet during the conference. We recommend that you make sure to take your laptop with you and bring it with you.

ORGANIZATION COMMITTEE

Conference Organization

Organizing Committee

General Chair: Jose L. Rico-Martin, Complutense University of Madrid

Vice-General Chair: Ghath Rabadi, School of Modeling, Simulation and Training, University of Central Florida

Program Co-Chairs: Deniz Cetinkaya, Bournemouth University and Roman Cardenas, Universidad Politécnica de Madrid

Proceedings Chairs: Samuel Ferrero-Losada, Complutense University of Madrid, Madrid, Spain; Ahmad Bay Abdelnabi, School of Modeling and Simulation, University of Central Florida, Orlando, Florida

Awards Chairs: Andreas Tollk and Herbert Prähofer

WELCOME

ORGANIZATION COMMITTEE

Conference Organization

Tracks and Chairs

Annual Simulation Symposium (ANSS) Chairs: Joachim Dettl, University of Antwerp, and Yilin Huang, Delft University of Technology

Communications Technologies and Networking Simulation (CTNS) Chairs: Abderrazek Alkhatib, TUM School of Management and Patricia Arce, Universidad Politécnica de Madrid

Cyber-Physical Systems and Digital Twins (CPS/DT) Chairs: Sobel Sabel, University of Central Florida and Yoon Voonnam, University of Antwerp

High Performance Computing and Simulation (HPCS) Chairs: James Nairne, Oak Ridge National Laboratory and Francisco M. Garcia, Universidad Complutense de Madrid

Human Agents and Cooperative Artificial Societies (HACS) Chairs: Thomas Clemens, RWTH Aachen and Karlheinz Schaefer-Serna, Pontificia Universidad Javeriana

Machine Learning and AI (MLAI) Chairs: Arsen Maltsev, University of Warwick and Boudouk Pappas, The MITRE Corporation

Modeling and Simulation for Sustainability and Smart Energy Systems (MSSES) Chairs: James Nairne, Oak Ridge National Laboratory and Dominique Blouin, Telecom Paris

Modeling and Simulation in Cyber Security (MCS) Chairs: Sachin Shetty, Old Dominion and Danda Rawat, Howard University

Modeling and Simulation in Medicine Chairs: Michel Audette, Old Dominion University and Jerry McRae, University of Arizona

Simulation in Education and Training (SET) Chairs: Ghath Rabadi, School of Modeling, Simulation, and Training, University of Central Florida and Jalal Fawzi, Université Catholique de Lille

Symposium on Simulation for Architecture and Urban Design (SimAUD) Chairs: Mohamed Aly Bouna, University at Buffalo, Gabriel Wozniak, TU Witten and Angelos Chrousos, Infrared City and Austrian Institute of Technology

Theory and Foundation for Modeling and Simulation (TFS) Chairs: Gabriel Wozniak, Carleton University and Paolo Bocciaardi, University of Rome Tor Vergata

Tutorials Chairs: Scott Brown, The MITRE Corporation, Gailin Seta Euc, De Montfort University, Souvik Barua, Tata Consultancy Services Research

PhD Colloquium Chairs: Cristina Ruiz Martin, Carleton University and Jose Pagan, Technical University of Madrid

WELCOME

WELCOME

Welcome from The Society for Modeling and Simulation International (SCS)

Welcome from the ANNSIM'25 Conference Chairs

Dear Colleagues and Friends,

On behalf of the Organizing Committee, welcome to the Annual Modeling and Simulation Conference (ANNSIM 2025). We are delighted to have you here in Madrid at the Complutense University of Madrid.

This year, ANNSIM brings together researchers, practitioners, and students from around the world to share the latest advances in modeling and simulation. The program covers a wide range of topics, from the core theories and methods that underpin our field to cutting-edge areas like Artificial Intelligence, Cloud and Quantum Computing, Digital Twins, and High Performance Computing applied to simulation.

Over the next few days, you will have the opportunity to attend presentations across our diverse technical tracks. We are especially excited to feature two extraordinary keynote speakers. On Monday, Prof. Katherine Mayes from the University of Melbourne will discuss simulation insights for our generation. David and Queen's Computing.

On Tuesday, Prof. Carolina Cruz-Uribe from the University of Central Florida will share her insights on Simulation, Verification, and Digital Twins.

In addition to the main tracks and keynote, the program includes insightful tutorials, a PhD Colloquium for our emerging researchers, and a Workshop/Progress track showcasing the latest ongoing work. We hope you will also join us for the Conference Reception to connect with colleagues in related settings.

Putting together a conference like ANNSIM takes a tremendous amount of effort. We want to extend our sincere gratitude to the entire Organizing Committee, the Society for Modeling and Simulation International, the Track Chairs, the Program Committee members, and all the reviewers for their hard work and dedication. We also thank our sponsors and speakers for sharing their valuable research with us.

We encourage you to actively participate in the sessions, engage in discussions, and take advantage of the networking opportunities. We hope ANNSIM 2025 is a productive and enjoyable experience for everyone. Please also take some time to explore the wonderful city of Madrid.

Welcome once again!

Sincerely,

Jose L. Rico-Martin
ANNSIM 2025 General Chair
Complutense University of Madrid, Spain

Ghath Rabadi
ANNSIM 2025 Vice-Chair
School of Modeling, Simulation and Training, University of Central Florida, Orlando, FL, USA

Deniz Cetinkaya
ANNSIM 2025 Program Chair
Bournemouth University, Dorset, England

Roman Cardenas
ANNSIM 2025 Proceedings Chair
Universidad Politécnica de Madrid

GENERAL INFORMATION

General Information

GENERAL INFORMATION

General Information

Registration

Your registration for D6.7 2025 Annual Meeting and Simulation Conference (AMSCON25) includes the following: morning, afternoon breaks, lunch on Monday and Tuesday, the Monday evening reception and access to all sessions and materials. The Monday reception will be located in the Cafeteria.

Registration Hours **Location: Main Hall**

- Monday, May 26, 2025 0:30 am – 5:00 pm
- Tuesday, May 27, 2025 0:30 am – 5:00 pm
- Wednesday, May 28, 2025 0:30 am – 5:00 pm
- Thursday, May 29, 2025 0:30 am – 12:00 pm

Please note that the registration desk will be closed for lunch from Monday through Thursday.

Continental Breakfast **Location: Cafeteria**

- Monday, May 26, 2025 0:30 am – 9:00 am
- Tuesday, May 27, 2025 0:30 am – 9:00 am
- Wednesday, May 28, 2025 0:30 am – 9:00 am
- Thursday, May 29, 2025 0:30 am – 9:00 am

Coffee Breaks **Location: Cafeteria**

- Monday, May 26, 2025 10:30 am – 11:00 am, 1:30 pm – 3:30 pm
- Tuesday, May 27, 2025 10:30 am – 11:00 am, 1:30 pm – 3:30 pm
- Wednesday, May 28, 2025 10:30 am – 11:00 am, 1:30 pm – 3:30 pm
- Thursday, May 29, 2025 10:30 am – 11:00 am, 1:30 pm – 3:30 pm

Heavy Breakfast with Reception (Conference Hall)

- Monday 9:00 am – 10:30 am – 9:00 Keynote
- Tuesday 9:00 am – 10:30 am – 9:00 Keynote

Professor Rajkumar Buyya
Professor Carolina Cruz-Neira

KEYNOTE

Keynote Information

Systems and Simulation Toolkits for Building and Evaluating Solutions for Next-Gen Cloud and Quantum Computing

Professor Rajkumar Buyya, Director, Cloud Computing and Distributed Systems (CLOUDS) Lab, The University of Melbourne, Australia

Location: Conference Hall
Monday, May 26, 2025
9:15 am – 10:30 am

Abstract:

The twenty-first century digital infrastructure and applications are driven by Cloud computing and emerging Quantum computing paradigms. The Cloud computing paradigm has been transforming computing into the 5th utility wherein "computing utilities" are commoditized and delivered to consumers like traditional utilities such as water, electricity, gas, and telephony. It offers infrastructure, platform, and software as services, which are made available to consumers as subscription-oriented services on a pay-as-you-go basis over the Internet. Its use is growing exponentially with the continued development of new classes of applications such as AI-powered models (e.g., ChatGPT) and the mixing of cryptography with such as Bitcoin. To make Clouds pervasive, Cloud application platforms need to offer (1) APIs and tools for rapid creation of scalable and elastic applications and (2) a runtime system for deployment of applications on geographically distributed Data Center infrastructures (with Quantum computing nodes) in a seamless manner.

KEYNOTE

Keynote Information (Continued)

Software technologies for Grid, Cloud, Fog, Quantum computing developed under Duhayya's leadership have gained rapid acceptance and are in use at several academic institutions and commercial enterprises in 50+ countries around the world. Manjrasoft, Anela Cloud technology developed under his leadership has received "Prestigious Product Innovation Award", he served as founding editor-in-chief of the IEEE Transactions on Cloud Computing. He is currently serving as Editor-in-Chief of Software: Practice and Experience, a long-standing journal in the field established in 1974. He has presented over 750 invited talks (keynotes, tutorials, and seminars) on his vision on IT Futures, Advanced Computing technologies, and Spatial Science at international conferences and institutions in Asia, Australia, Europe, North America, and South America. He has recently been recognized as a Fellow of the Academy of Europe. For further information on Duhayya, please visit his cyberhome: www.duhayya.com

GENERAL INFORMATION

General Information

Conference Meetings & Events Summary

Monday **Plenary Session with Welcome and Keynote**
(9:00 am – 10:30 am)
Technical Sessions (11:00 am – 5:00 pm)
Lunch (12:30 pm – 1:30 pm)
Tutorial I (1:30 pm – 3:00 pm)
Welcome Reception (5:00 pm – 7:00 pm)

Tuesday **Plenary Session with Keynote and Awards**
(9:00 am – 10:30 am)
Technical Sessions (11:00 am – 5:00 pm)
Lunch (12:30 pm – 1:30 pm)
Tutorial II (1:30 pm – 3:00 pm)

Wednesday **Technical Sessions** (9:00 am – 5:00 pm)
Tutorial III (1:30 pm – 3:00 pm)
PhD Colloquium (11:00 am – 3:00 pm)

Thursday **Technical Sessions** (9:00 am – 12:30 pm)

KEYNOTE

Keynote Information (Continued)

These wide ecosystems of Cloud architectures integrated with new accelerators such as Quantum processing capabilities, along with the increasing demand for energy-efficient IT technologies, require timely, repeatable, and controllable methodologies for evaluation of algorithms, applications, and policies before their implementation in cloud products. As utilization of real methods limits the experiments to the scale of the tested and makes the reproduction of results an extremely difficult undertaking, alternative approaches for testing and experimentation leverage development of new Cloud technologies. A suitable alternative is the utilization of simulations tools, which open the possibility of evaluating the hypothesis prior to software development in an environment where one can reproduce tests. Specifically in the case of Cloud computing, where access to the infrastructure incurs payments in real currency, simulations based approaches offer significant benefits, as it allows Cloud customers to test their services in a repeatable and controllable environment free of cost, and to tune the performance bottlenecks before deploying on real Clouds and quantum processors. At the provider side, simulation environments allow evaluation of different kinds of resource leasing scenarios under varying load and pricing distributions. Such studies could aid the providers in optimizing the resource access cost with focus on improving profitability.

This keynote presentation covers (1) 21st century vision of computing and identifies various emerging IT paradigms that make it easy to realize the vision of computing utilities, (2) different approaches for evaluation of resource management and application scheduling algorithms, (3) latest CloudSim "76 model" supporting modeling, simulation, and experimentation of emerging Cloud computing infrastructures and application services, (4) case studies on the use of CloudSim in development

KEYNOTE

Keynote Information

Unlocking the Future: 30 Years of Innovation at the Crossroads of Visualization, Immersion, and Digital Twins

Carolina Cruz-Neira, Aggre Chair Professor in Computer Science
College of Engineering and Computer Science
University of Central Florida, Orlando, FL, USA

Location: Conference Hall
Tuesday, May 27, 2025
9:15 am – 10:30 am

Abstract:

The talk starts with a brief overview of over 30 years of hands-on experience at the vibrant intersection of visualization, immersion, and modeling & simulation (M&S). This talk unravels how these disciplines have converged to create a powerful gateway to digital twins, transforming discovery, insights, processes, and decision making. The talk will discuss several innovative projects and initiatives that have driven this evolution and discuss how leveraging these technologies across diverse fields has accelerated the successful integration and deployment of digital twins. However, many of these successes and potential solutions risk being overshadowed by the growing pressure to rapidly launch "new and innovative" digital twin technologies and applications which may still be in emergent stages.

This presentation shares "from-the-trenches" experiences on developing technologies and applications that have been critical to accelerate the development, integration, and acceptance of digital twins to yield successful outcomes. In particular, the presentation discusses visualization's critical role in the emerging digital twins and AI ecosystems. The presentation focuses on where the true innovation opportunities are today and how to get there.

KEYNOTE

Keynotes

KEYNOTE

Keynote Information (Continued)

and evaluation of policies for (a) management of Cloud Data Centre resources to minimize energy consumption, (5) use of Anela 6G software system for scheduling of applications to minimize the cost of computation, yet meeting users QoS requirements, and (6) new directions on modelling and simulation of Quantum computing systems and applications.

Biography:

Dr. Rajkumar Buyya is a Redmond Barry Distinguished Professor and Director of the Quantum Cloud Computing and Distributed Systems (QCCDS) Laboratory at the University of Melbourne, Australia. He is also serving at the founding CEO of Manjrasoft, a spin-off company of the University, commercializing its innovations in Cloud Computing. He has authored over 850 publications and seven textbooks including "Mastering Cloud Computing" published by McGraw Hill, Chua Machine Press, and Morgan Kaufmann for Indian, Chinese and international markets respectively. Dr. Buyya is one of the highly cited authors in computer science and software engineering worldwide (h-index=172, g-index=380, i10-index=809, and 157,600+ citations). A bibliometric study by Stanford University and Elsevier since 2019 (for six consecutive years). Dr. Buyya is recognized as the Highest-Cited author in the Distributed Computing field worldwide. He graduated 60 PhD students who are working in world leading research universities and high-tech companies such as Microsoft, Google, and IBM. He has been recognized as IEEE Fellow, a "Web of Science Highly Cited Researcher" for seven times since 2016, the "Best of the World" twice for research fields (in Computing Systems in 2019/2024 and Software Systems in 2021/2022/2023) as well as "Lifetime Achiever" and "Superstar of Research" in "Engineering and Computer Science" discipline twice (2019 and 2021) by the Australian Research Review.

KEYNOTE

Keynote Information (Continued)

The talk's intention is to understand the complexity gaps and challenges we face, while revealing insights that can guide us toward more sustainable, impactful solutions in the digital twin landscape.

Biography:

Dr. Carolina Cruz-Neira, a member of the National Academy of Engineering, is a pioneer in the areas of virtual reality (VR), interactive visualization, and digital twins. Her work has translated to standard tools in industry, government, and academia. She is known world-wide for being the creator of the CAVE VR system, for pioneering research into practice by spearheading several Open-Source initiatives, such as VRJuggler, and by leading entrepreneurial initiatives to commercialize research. She has over 150 publications and, together with her collaborators, has been awarded over \$400 million in grants, contracts, and donations. She is recognized for funding successful VR research centers: the Virtual Reality Applications Center at Iowa State University, the Louisiana Immersive Technologies Enterprise, and the Emerging Analytics Center at the University of Arkansas. She serves in international technology boards, government technology advisory committees.

One of her recent roles was being part of the National Academies report on Foundational Research Gaps and Future Directions for Digital Twins. She enjoys interesting her research with the arts and the humanities through dance performances and museum installations. She has been named one of the top innovators in virtual reality and one of the top three greatest women visionaries in VR, she is the first person inducted to the National Academy of Engineering for contributions to immersive technologies and VR, she is a member of the IEEE VR Academy, an IEEE Fellow, an ACM Computer Pioneer.

Keynote Information (Continued)

an IEEE VR Hall of Fame member, and a Modeling and Simulation Hall of Fame. She received the IEEE VR Achievement Award and the International Digital Media & Arts Society Distinguished Career Award among many national and international recognitions. She has given numerous keynote addresses, and she advises governments on how VR can help to give industries a competitive edge leading to regional economic growth. She has appeared in numerous national and international TV shows and podcasts as an expert on her discipline and several documentaries have been produced about her life and career. Currently, Dr. Cruz is the Agnese Chair in Computer Science at the University of Central Florida where she is the co-leader of the UCF Digital Twin Initiative.

KEYNOTE

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TMS Session Keynote Information

AI assisted Metamorphic Testing for Domain specific Modelling and Simulation

Professor Dr. Juan de Lara

Computer Science at Universidad Autónoma, Madrid Spain

Location: Classroom 14

Wednesday, May 28, 2025

9:00 a.m. — 10:30 a.m.



Abstract:

Testing is essential to improve the correctness of software systems. Metamorphic testing (MT) is an approach especially suited when the system under test lacks oracles, or they are expensive to compute. However, building an MT environment for a particular domain (e.g., cloud simulation, automated driving simulation, production system simulation, etc.) requires substantial effort.

To alleviate this problem, we propose a model-driven engineering approach to automate the construction of MT environments, which is especially useful to test domain specific modelling and simulation systems. Starting from a meta-model capturing the domain concepts, and a description of the domain execution environment, our approach produces an MT environment featuring comprehensive support for the MT process. This includes the definition of domain specific metamorphic relations, their evaluation, detailed reporting of the testing results, and the automated search-based generation of follow-up test cases.

In this talk, I will present the approach, along with ongoing work and perspectives for integrating intelligent assistance based on large language models in the MT process. The work is a joint collaboration with Pablo Gómez-Aguo, Pablo C. Gutiérrez and Esther Guerra from the mine research group.

KEYNOTE

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TMS Session Keynote Information

Biography:
Juan de Lara is full professor at the computer science department of the Universidad Autónoma de Madrid (Spain), where he leads the modelling and software engineering research (msw) team together with Esther Guerra. His main research interests are in automated software engineering, model-driven development, low-code development, domain specific languages and language engineering, conversational agents and intelligent assistants. This research has led to building many practical tools including Ayuda, AtoMS, metaDepth, metaUML and Gotta and the publication of more than 270 papers in international journals and conferences. He has been the PC co-chair of several conferences within his research area, like MODELS, SLE, ICOT, ICMT and PASL. He is on the editorial board of the SoSyM Journal (Springer), and has been involved in the organization of workshops on topics like flexible modelling, multi-level modelling and low-code development.

MSM Session Keynote Information

Quantum Discrete Optimization and its Applications in Healthcare

Professor Wojciech Kulejko

Head of Department of Control Systems and Mechatronics, Faculty of Information and Telecommunication Technologies, Wrocław University of Science and Technology

Location: Classroom 14

Monday, May 26, 2025

3:30 p.m. — 5:00 p.m.

(see page 33 for more information)

KEYNOTE

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Tutorials Information

Tutorial I: Introduction to Quantum Computing: Designing Quantum Circuits and Running Them on Quantum Simulators

Date | Time: Monday, May 26, 2025 | 1:30 p.m. — 3:00 p.m.

Presenter: Deniz Çetinkaya

Location: Classroom 14

Tutorial II: Defining a Shared Standard of Verification and Validation for Agent-Based Models

Date | Time: Tuesday, May 27, 2025 | 1:30 p.m. — 3:00 p.m.

Presenter: Sarah Wise

Location: Classroom 14

Tutorial III: Python-Based Simulation Platforms

Date | Time: Wednesday, May 28, 2025 | 1:30 p.m. — 3:00 p.m.

Presenter: Wenbing Zhao

Location: Classroom 15

TUTORIALS

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Map

MAP

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Complutense University Campus



MAP

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ANNSIM'25 Sessions at a Glance

	ANNS	CNS	CPS/DT	EMSS	TMS	HEPC	HEPNET	MLAB	SASIS	MSCS	SET	MSM	PhD
Monday, May 26, 2025													
9:00 a.m. — 10:30 a.m.	SCS Plenary												
10:30 a.m. — 11:45 a.m.	Break												
11:45 a.m. — 12:30 p.m.	Session Block I												
12:30 p.m. — 1:30 p.m.	Work Off-Lunch												
1:30 p.m. — 3:00 p.m.	Session Block II												
3:00 p.m. — 3:30 p.m.	Break												
3:30 p.m. — 5:00 p.m.	Session Block III												
Tuesday, May 27, 2025													
9:00 a.m. — 10:30 a.m.	SCS Plenary												
10:30 a.m. — 11:45 a.m.	Break												
11:45 a.m. — 12:30 p.m.	Session Block IV												
12:30 p.m. — 1:30 p.m.	Lunch on your own												
1:30 p.m. — 3:00 p.m.	Session Block V												
3:00 p.m. — 3:30 p.m.	Break												
3:30 p.m. — 5:00 p.m.	Session Block VI												
Wednesday, May 28, 2025													
9:00 a.m. — 10:30 a.m.	Session Block VII												
10:30 a.m. — 11:45 a.m.	Break												
11:45 a.m. — 12:30 p.m.	Session Block VIII												
12:30 p.m. — 1:30 p.m.	Lunch on your own												
1:30 p.m. — 3:00 p.m.	Session Block IX												
3:00 p.m. — 3:30 p.m.	Break												
3:30 p.m. — 5:00 p.m.	Session Block X												
Thursday, May 29, 2025													
9:00 a.m. — 10:30 a.m.	Session Block XI												
10:30 a.m. — 11:45 a.m.	Break												
11:45 a.m. — 12:30 p.m.	Session Block XII												

Agenda at a Glance

Daily Agendas

Monday

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Annual Modeling and Simulation Conference 2025	
Agenda	
Monday, May 26, 2025	
Modeling and Simulation in Cyber Security (MSCS)	
Session Block I	11:00 jam —12:30 jam Room: Classroom 15
A Modeling and Simulation Framework to Support Cybersecurity Engineering by Moussa Kotta, Youssouf M. Diagne, Oumar Y. Maiga and Mamadou Kabane Traoré	
Automatic Generation of CNN Models for Radiofrequency Fingerprinting by Reginio Garcia-Aguirre, Carlos Moe Perera and Ben M. Nassar-López	
Machine Learning and AI in Simulation (MLAIS)	
Session Block II	1:30 jam —3:00 jam Room: Classroom 13
Building a Thermal Building Data Generation Framework for Transfer Learning by Thomas Krug, Fabian Ruckel, Markus Wirsberger, Dominik Altmeyer, Ferdinand Sigg, Benjamin Schöler and Benjamin Tischler	
Real Time Efficiency Control for Ship to Ship Systems Using Spiking Neural Networks based Reinforcement Learning by Yijing Pan, Chen Zhao, Lin Zhang and Haining Zhang	
Towards a Validity Frame of Multi-modal Surrogate Models for Traffic Simulation by Rabeah Bigard, Claudin Gomes and Joachim Dell	

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Annual Modeling and Simulation Conference 2025	
Agenda	
Tuesday, May 27, 2025	
57th Annual Simulation Symposium (ANSS)	
Session Block IV	11:00 jam —12:30 jam Room: Classroom 13
Discrepancy of Lane Flow Distribution and Lane-Wise Speed Distribution When Simulating Lane-Change Behaviour in Simulation of Urban Mobility (SUMO): A Comparison of Two Car-Following Models by Chulhan Gao	
A Multiscale Model for Australian Army Recruitment and Training Planning by Karle Mortimer, Cameron Pike and Terry Gavil	
Simulation Analysis of Soccer Placement and Target Interaction in DEVS Formalism by Yoon Park, Hyungsik Na and J. Chul Moon	
Human Agents and Cooperative Artificial Societies (HACAS)	
Session Block IV	11:00 jam —12:30 jam Room: Classroom 14
Using Virtual Reality to Simulate and Study the Movements of School Shooters by Christopher A. McCue and Alan R. Wagner	
Towards a Quantitative Science of Nonviolence: Sensitivity Analysis of an Agent-Based Model of Nonviolent Resistance by Joshua Steadman, Hang Trung Dinh and Laura Pissidella	

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Annual Modeling and Simulation Conference 2025	
Agenda	
Monday, May 26, 2025	
Annual Simulation Symposium (ANSS)	
Session Block III	3:30 jam —5:00 jam Room: Classroom 13
Minimum Time Search and Rescue Missions Involving GPS with a Framework Supported by 2DPS, RHC and PSL by Juan Bautista Bordin Ruiz, Jose L. Rico-Martín, Ana Brás-de-Faria and José A. López-Oviedo	
Simulating Combinatorial Double Auctions: A Deep and Multi-agent Approach with Different Participated Behavior by Juan De Anton Heredero, Cristina Ruiz Martín, Félix Viladéu and David Pozo	
Simulating HbB3 Telemedicine with Agent-based Models by Doo Beroch and Ricardo Lazo	
Cyber-Physical Systems and Digital Twins (CPS/DT)	
Session Block III	3:30 jam —5:00 jam Room: Classroom 15
PFI-based Distributed Co-simulation with Enhanced Security and Intellectual Property Safeguards by Santiago Gil, Román J. Bae, Christian L. Jensen, Sebastian Engstgaard, Giuseppe Anilati and Cláudio Gomes	
Towards a Standardized Framework for Developing Transiently Self-Adaptive Robotic Systems by Sahar Noem Nishad, Ben Van Acker and Paul De Moor	
Towards Redefining IoT and Simulation Systems: An RL-Based Approach by Michel B. Radtsil, Juhel Forik, Emilio Jimenez, Marco Corbelli, Roy Abi Zeid Doss and Charles Yassoub	

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Annual Modeling and Simulation Conference 2025	
Agenda	
Tuesday, May 27, 2025	
57th Annual Simulation Symposium (ANSS)	
Session Block IV	11:00 jam —12:30 jam Room: Classroom 13
Discrepancy of Lane Flow Distribution and Lane-Wise Speed Distribution When Simulating Lane-Change Behaviour in Simulation of Urban Mobility (SUMO): A Comparison of Two Car-Following Models by Chulhan Gao	
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Annual Modeling and Simulation Conference 2025	
Agenda	
Monday, May 26, 2025	
Theory and Foundations for Modeling and Simulation (TMS)	
Session Block I	11:00 jam —12:30 jam Room: Classroom 13
Incorporating Human in the Loop Interactivity through the Integration of Discrete Event Simulation and Virtual Reality by Joseph Jabbour, Juhel Forik, Adriano L. Silva, Charles Yassoub, Henry Kohn and Greg Zacharewicz	
Data-driven Simulation-based Analysis of Collaborative Business Processes in Distributed Environments by Paolo Bocciaelli and Andrea D'Ambraglio	
Robustness Simulation Uncertainty Quantification against Input Data Outlier by Haining Zhang and Juhel Forik	

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Tuesday

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Annual Modeling and Simulation Conference 2025	
Agenda	
Tuesday, May 27, 2025	
Simulation of Architectural and Urban Design (SimA/UD)	
Session Block IV 11:00 a.m.—12:30 p.m. Room: Classroom 15	
Enhancing Environmental Performance-driven Design Decisions through Immersive Exploration by Amir Molla, Naga Venkata Sai Kumar Manupragada and Jonathan Natanian	
Towards Quantifying Visual Exposure and the Resulting Privacy Concerns in Residential Building by Jeeha Kim, Katharina Kral and Tamer Dogan	
A Simulation-based Approach to Teaching BPGC Design to Architecture Students by Ali Inani and Christoph Ruitzbart	
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Annual Modeling and Simulation Conference 2025	
Agenda	
Tuesday, May 27, 2025	
Communication technologies and Networking Simulation (CNS)	
Session Block V 1:30 p.m.—3:00 p.m. Room: Classroom 15	
Modeling and Simulation of Virtual Gas through Routing in Multidimensional Interconnection Networks by Benjamin Ehrlich, Yelena Rykova and Lev Il. Levin	
An Adaptive Data Transfer Technique for Sensor-based Systems by Juan Contreras and Shihumeh Majumdar	
Simulation of Deep Neural Networks by Data Parallelization by Jorge A. Lopez and Abdolreza Abouei	
Modeling and Simulation in Medicine (MSM)	
Session Block V 1:30 p.m.—3:00 p.m. Room: Classroom 15	
A Virtual Guiding Approach for the Computer-Assisted Surgical Trainer by	
Towards a Prototype for Virtual Reality and Haptic Feedback Integration in Computer-Assisted Surgical Training by Ashlee Puggins, Vitoria Antunes, Jason Li Zhang, Václav Pajurek, Jerry V.Q. Rosenblatt and Ragnor Li, Chang	
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Annual Modeling and Simulation Conference 2025	
Agenda	
Tuesday, May 27, 2025	
Cyber Physical Systems and Digital Twins (CPS/DT)	
Session Block VI 3:30 p.m.—5:00 p.m. Room: Classroom 15	
Dynamic Development of Traffic Simulations for Urban Digital Twins by Martin McCarthy, Carolina Cruz Neira and Dirk Stiers	
Developing Urban Digital Twins for Mobility by Zeehan Ali, Mami Dinkhi and Mamadou Kaba Traore	
Theory and Foundations for Modeling and Simulation (TMS)	
Session Block VI 3:30 p.m.—5:00 p.m. Room: Classroom 13	
A Framework for Iterative Verification and Validation of MLP Scheduling Models Based on Petri Nets by Shenghui Peng and Helena Stenroos	
Toward Models of Collective Intelligence for Goal-Directed Search in Exploratory Simulation and Analysis by Levent Yilmaz	
Simulation of Quasibacteria Behavior in Water Bricks with cell DEVS and Lattice Boltzmann Methods by Samuel Ferrero-Losada, Jose La Roca-Martin, José Antonio López-Ocasio and Roman Cardenas	
Simulation in Education and Training (SET)	
Session Block VI 3:30 p.m.—5:00 p.m. Room: Classroom 14	
Advancing Digital Twin Education through Graduate Corequisite by Ghaleb Rahadi, Bulent Seyhan, Sahal Selvi and Isaac Mendez	
Simulation as Transformation Approach for Enhancing Lean Performance Impact Assessment, Lean Sustainability, and Lean Learning by Anne Zoeggler, Jalal Pasvok and Adriano Sola	
Data-Driven Design for Developing a Virtual Laboratory for STEM Education by Yiyang Li and Yuhong Shen	
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Wednesday

Annual Modeling and Simulation Conference 2025	
Agenda	
Wednesday, May 28, 2025	
Humans Agents and Cooperative Artificial Societies (HACAS)	
Session Block VII 9:00 a.m.—10:30 a.m. Room: Classroom 13	
The Transparency Imperative: The Need for Model Documentation for Engaging with Public Policy Following the EU AI Act by Michael Frank Belfrage, Fabian Lorig, Christopher Frantz, Jason Tucker and Paul Davidson	
Contribution of Agent-based Social Simulation Models: Approaches and Challenges by Emil Johansson, Fabian Lorig and Paul Davidson	
Resilient Social Networks in Agent-based Modeling by Maxim Malikov and Rüdiger Süssner-Strauss	
Theory and Foundations for Modeling and Simulation (TMS)	
Session Block VII 9:00 a.m.—10:30 a.m. Room: Classroom 14	
KEYNOTE: AI-assisted Metamorphic Testing for Domain-specific Modeling and Simulation by Juan de Lara (see page 29 for more details)	
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Annual Modeling and Simulation Conference 2025	
Agenda	
Wednesday, May 28, 2025	
Simulation of Architectural and Urban Design (SimA/UD)	
Session Block VII 9:00 a.m.—10:30 a.m. Room: Classroom 15	
Validation of the Shape Transformation Protocol for Simulating Non-cuboid Compartments in CGST using PBS Simulations by Chengde Wu, Wei Yan and Mark J. Clayton	
Brake Force Optimization Workflow with Parallel Computing for Building Lifecycle Analysis: A Comparison with Multi-Objective Optimization with the Evolutionary Approach by Yang Yang and Marco Cimillo	
SynPerception: A Real-time Urban Perception Prediction Tool Based on Graph Neural Networks by Ziqi Gu and Shengqi Lu	
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Annual Modeling and Simulation Conference 2025	
Agenda	
Wednesday, May 28, 2025	
Annual Simulation Symposium (ANSS)	
Session Block VIII 11:00 a.m.—12:30 p.m. Room: Classroom 13	
Quality in DES, SD and ABM: An Algorithmic Analysis of Literature by Chris Laverence	
Reproducibility and Reliability of Simulation Models by Yilin Huang	
A Review of Quantum Modeling and Simulation Approaches for Lithium Ion Batteries by Drezia Gotskaya and Amro Abdelkader	
Modeling and Simulation for Sustainability and Smart Energy Systems (S&SES)	
Session Block VIII 11:00 a.m.—12:30 p.m. Room: Classroom 14	
Entropy and Sustainability Analysis with a Novel Modular Configuration: Multi-modal White Box Building Model by Harshith Cheng, Viki Hagemeier and Eliseyin K. Çakmak	
Effect of Electric Vehicle Charging Scheduling and Battery Energy Storage System on GHG Load at an Airport by Prithvi Godec and Steve McCreery	
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Annual Modeling and Simulation Conference 2025	
Agenda	
Wednesday, May 28, 2025	
Modeling and Simulation in Medicine (MSM)	
Session Block VIII 11:00 a.m.—12:30 p.m. Room: Classroom 15	
Simulation of Breast Deformation Due to Ultrasound Probe by Maria V. Alqaoud, John Finnemore, Sita Pellorci, Aleksandr Kozlovskiy, Krishnasundar Kalpa, Gaber Fischinger and Michel Audette	
Impact of a Dynamic Nurse-to-patient Ratio Policy in the ICU: A Hybrid Simulation Model by Qunshuoluo Hui and Lena Abu-Bi-Hajja	
Ph.D. Colloquium	
Session Block VIII 11:00 a.m.—12:30 p.m. Room: Classroom 12	
Proximal Policy Optimization for Multi-Agent Engagements in Beyond Visual Range Air Combat by Juan Dantón	
Discrete Event Simulation Model for Comprehensive Cervical Cancer Care in India: A Case Study of AIIMS Bhopal by Vinod Pundarikar	
On Structural Adaptivity in Region-based Process Mining by Shenghui Peng	
Model Directed Systems Engineering for Quasibacteria Bloom Management by Samuel Ferrero-Losada	
DEVSMA: On the Path of Standardized DEVS Model Representation by Sankethar Mangalam Govind	
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Annual Modeling and Simulation Conference 2025		
Agenda		
Wednesday, May 28, 2025		
Theory and Foundations for Modeling and Simulation (TMS)		
Session Block IX	1:30 pm.—3:00 pm.	Room: Classroom 13
DEVSMap: On the Path of Standardized DEVS Model Representation by Sanketh Mangamuri Govind, Roman Cardenas and Gabriel Wainer A Theoretical Framework for Model-Based Life Cycle Engineering of Simulation Models by Philipp Zech, Hans Vangheluwe and Ruth Breu Parallel DEVS Specification Language for Modeling: Mathematical Approach and Grammar by Gertjan Bakkerd, Clément Foucher and Eric Ramat		
PhD Colloquium		
Session Block IX	1:30 pm.—3:00 pm.	Room: Classroom 12
Microfluidic Systems Enhanced by Artificial Intelligence for Water Analysis: Simulation and Sensing Perspectives by Juan Simabaco-López Container-Based Simulation: A Framework for Large Simulation Experiments by Daniel Seuffert Modeling and Simulating the Behavior of a Non-verbal Autistic Individual: The Digital Twin Approach by Dominik Mikerecki Modeling and Simulation of Logistic Flow in Container Ports GOLF - Generator of Logistic Flow by Parashad Sharda		

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Annual Modeling and Simulation Conference 2025		
Agenda		
Wednesday, May 28, 2025		
Communication technologies and Networking Simulation (CNS)		
Session Block X	3:30 pm.—5:00 pm.	Room: Classroom 13
DEVS over MQTT to Enable Distributed Real-Time Simulation by Roman Cardenas, Patricia Arriba, Segundo Benben and Jose L. Risco-Martin Optimizing Energy Efficiency Performance in RIS-enabled Near-field MIMO System Using Deep RL by Anjad Al Jishi, Ali's Al-Halabsha, Gabriel Wainer and Gery Boudineau		
Simulation of Architectural and Urban Design (SimAUI)		
Session Block X	3:30 pm.—5:00 pm.	Room: Classroom 15
Evaluating Window-to-wall Ratio in Generative AI Architectural Design: Insights from SHAP Analysis and Predictive Modeling by Kaibing Zhang, Xuebin Jia and Taro Nishihara Carbon Neutral Solar Powered Outdoor Cooling Shelter by Ji Yoon Han, Kayleigh Houde, Eric Tittelbaum and Dori Aviv Modeling the Joint Effects of Thermal Comfort, Built Environment, and Socio-Demographics on Active Mobility: A Data-driven Approach by Xinyue Yan, Timur Dogan and Yang Yang		

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Thursday

Annual Modeling and Simulation Conference 2025		
Agenda		
Work in Progress		
Wednesday, May 28, 2025		
Session Block IX	1:30 pm.—3:00 pm.	Room: Classroom 14
Multi-Sensor Fusion and SLAM-Based Digital Twin Integration for Simulated Accessibility Assessments in Complex Architectural Environments by Luis Borunda Real-Time Prediction of Brain Deformation in Surgical Simulation Using Transformer-Based Segmentation by Manal Aziz, Sameeh Penderkar, Yan Kye W and Guo Shuang Comparative Analysis between Different Optimization Methods for Indoor Daylighting across Six Different Locations by Manal Aziz, Sameeh Penderkar, Yan Kye W and Guo Shuang Postural Stability Assessment Based on Deep Learning, Camera, and Low-cost Sensor Technology by Thiyoung Li, Jose Pagan, Milagros Jafin Vargas and Jose Javier Serrano Glendon		
Session Block X	3:30 pm.—5:00 pm.	Room: Classroom 14
Automated Part Checking Using Discrete Event System Specification Based on Concept of Concurrent Simulation by Qiyi Zhang, Li, Maamar el Amine Hami, Arman Yacoub and Ismail Badache Towards a Modeling and Simulation Approach for Socio-ecosystems Based on the Memory's Trail and Digital Twins by Chevenne Idzard, Paul-Antoine Bugeaud, Raphael Dubois and Gavriel Salvendy Towards Composite Discrete Event and Agent-based Simulations by Kevin A. Brown, Jonathan Orl, Swann Perarnau, Nicholson Collier, Jamie Cook and James Liu Towards a Model of the Italian Wheel System: Agent-based Simulations for Sustainable Policies Design by Giuseppina Gualini, Concetta Cardillo, Alessandro Ceccarelli, Arianna Di Paola and Baldemaro Di Giuseppe		

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Annual Modeling and Simulation Conference 2025		
Agenda		
Work in Progress		
Thursday, May 29, 2025		
Session Block XI	9:00 am.—10:30 am.	Room: Classroom 14
Building Analysis Tool: Designing for the Visually Impaired by Eleftheria Papadimitriou, Eleni Papadimitriou, Kasper Vindlevskov, Noudoula Elmalouli, Sahil Yousaf, Gertjan Garcia-Perez, Lora Fahmy and Angelos Christos Agent-based Simulation of a Support System to Improve Accessibility for Disabled Individuals in Hospitals by Dargi Kaya, Ali Firat Task, Karim Tack, Galen Seta Das and Denis Cerdas Envisioning Smart Autonomous Vehicle Control: A Novel Framework for Driver State Management through Adaptive AI-driven Intervention by Arsalan Margosh, Sami Wills, Tarek Mulla and Marthea Mulla (Virtual Presentation)		
Session Block XII	11:00 am.—12:30 pm.	Room: Classroom 14
Analyzing Economic Resilience Probabilities through Interest Rates and Labor Market Indicators by Jovanka N. Morais Multimodal Validation of Simulation Scenarios for Optimization of the New Dynamic Electricity Prices by Thomas Wiedemann Improving Automatic Parallelization for Quantum-Based Mathematical Modeling and Simulation Using Metaheuristic Optimization by Abdelrazek G. Hentien and Adrian Pop Contribution to Model-based Interpretable Simulations: The MIS Approach by Rolf Miesbach, Martin Kubi, François Troussier and Greg Zacharewicz		

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Annual Modeling and Simulation Conference 2025		
Agenda		
Theory and Foundations for Modeling and Simulation (TMS)		
Session Block XII	11:00 am.—12:30 pm.	Room: Classroom 13
Graph-based Analysis of Best Practices in Asthma Centre Design by Daria Al-Harazin and Waleed Jaki Case Study on Applying Multi-criteria Genetic Algorithms for Hotel Design Optimization by Agnieszka Adamska-Idzikowska and Radosław Idzikowski Living Lab Digital Twin: Case Study of the Development of a Research-oriented Digital Twin in a LEED Platinum Academic Building by David Gerber, Niles McGlashan, Simon Breckler and Anne Klein		
Simulation of Architectural and Urban Design (SimAUI)		
Session Block XII	11:00 am.—12:30 pm.	Room: Classroom 15
Graph-based Analysis of Best Practices in Asthma Centre Design by Daria Al-Harazin and Waleed Jaki Case Study on Applying Multi-criteria Genetic Algorithms for Hotel Design Optimization by Agnieszka Adamska-Idzikowska and Radosław Idzikowski Living Lab Digital Twin: Case Study of the Development of a Research-oriented Digital Twin in a LEED Platinum Academic Building by David Gerber, Niles McGlashan, Simon Breckler and Anne Klein		

**School of Modeling Simulation and Training**
University of Central Florida
<https://www.ucf.edu/smt/>

The School of Modeling, Simulation, and Training (SMT) is a leading interdisciplinary academic unit under the College of Engineering and Computer Science that offers cutting-edge research and graduate educational programs in modeling and simulation (MS). Our programs are among the most established in the U.S. and globally with 25 years of history in graduate education.

SMT is home to faculty with diverse backgrounds including Engineering, Computer Science, Psychology, Human Factors, Urban Planning, Information Science, Artificial Intelligence, Cognitive and Learning Science. The faculty conduct interdisciplinary research in various areas of application including defense, healthcare, transportation systems, logistics, automated process, Digital Twin among several others.

SMT offers the following graduate programs (in-person and online):

- Ph.D. in Modeling and Simulation
- M.S. in Modeling and Simulation
- Graduate Certificate in Behavioral Cyber Security
- Graduate Certificate in Digital Twin

Research labs at SMT include:

- [Advanced Modeling, Simulation, and Optimization Lab \(AMSO\)](#)
- [Behavioral, Human, and Simulation Lab](#)
- [Health, Energy, and Advanced Technology \(HEAT\)](#)
- [High-Performance AI Lab \(HAIL\)](#)
- [Human-centered AI for Sustainable Technology Innovation \(HASTI\) Lab](#)
- [Human Lab](#)
- [SMT Lab](#)
- [Urban Digital Twin Lab](#)

SMT is part of a vibrant campus located in Orlando, Florida a hub for modeling and simulation. SMT is also co-located and partners with the Institute for Simulation and Training (IST). SMT receives federal, state and private research funding including but not limited to NSF, DoD, NATO, DoE, Dept of Education among many others.

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Event information	
Event name (and acronym)	EU-Japan Digital Week, Workshop “Critical Applications of AI in Industry, Healthcare and Other Sectors
Type of event	Workshop
Date	April 7, 2025
Location	Tokyo, Japan
Geographic coverage	Europe, Japan, Korea
Type of audience	Experts on critical AI applications for industry, transports, healthcare and other real-world domains, experts on cyber-security, Japanese companies.
Approximate size of audience	Approximately 80 persons
Short description	The objective of the workshop was to exchange on good practices and challenges in the development of AI applications where reliable and highly accurate functioning is critical due to the potential for severe consequences in case of failure. These applications, found in sectors such as transportation systems, industrial production, and digital healthcare, require AI systems to operate with extremely high reliability to prevent accidents, patient harm, or significant financial losses. The workshop explored how to ensure robustness, safety, and trustworthiness in such critical AI systems.
Information about dissemination activity	
Presentation title	Critical applications of AI in the metals and steel industry
Presenter	Valentina Colla (SSSA)
Other partners involved	TENOVA
Hashtag(s) for Social Media	#steel #training #digitalisation #EAF
Attachments (e.g. agenda, invitation)	Agenda of the workshop

AGENDA

09:30 – 10:00

ARRIVAL AND REFRESHMENTS

OPENING

10:00 – 10:30

- **Welcome and presentation of the INPACE Project**
Prof. Sebastian Engell, TU Dortmund and ENRICH GLOBAL
- **Welcome address from Hitachi Ltd.**
- **Welcome address from the Japan AI Safety Institute (AISI)**
Mirai Odagiri, Deputy Secretary General, Japan AI Safety Institute (AISI)

10:30 – 12:30

SESSION 1: TRANSPORTATION SYSTEMS AND HEALTH CARE

How Hitachi is using AI in its Social Innovation Business

- **Nobuo Nukaga**
Hitachi R&D, Advanced Artificial Intelligence Innovation Center, Japan

Safety assurance of a driverless regional train

- **Dr. Marc Zeller**
Siemens AG, Germany

Search-based approaches to enhancing safety of autonomous driving system

- **Prof. Fuyuki Ishikawa**
National Institute of Informatics and Sokendai University, Japan

Challenges for AI applications in intensive care medicine

- **Dr. André Stollenwerk**
Embedded Systems Institute, RWTH Aachen, Germany

12:30 – 13:30

LUNCH

13:30 – 15:30

SESSION 2: AI IN INDUSTRIAL AUTOMATION

AI/ML-enabled digital transformation of Japan's process industries

- **Prof. Manabu Kano**
Department of Informatics, Kyoto University, Japan

Critical applications of AI in the metals and steel industry

- **Prof. Valentina Colla**
Scuola Superiore Sant'Anna, Italy

OT x AI safety approaches in Hitachi

- **Dr. Satoshi Otsuka**
Hitachi R&D, Mobility and Automation Innovation Center, Japan

AI for the automation of industrial processes

- **Dr. Martin Hollender**
ABB Corporate Research Center, Germany

15:30 – 16:00

COFFEE BREAK

16:00 – 17:00

**PANEL DISCUSSION: METHODS AND REGULATIONS FOR THE DEVELOPMENT OF CRITICAL AI APPLICATIONS AND
POTENTIAL FOR EU-JAPAN COLLABORATION**

CHAIR:

- **Prof. Iiro Harjunkoski**
Aalto University and Hitachi Energy

PANELISTS:

- **Dr. Marc Zeller**
Siemens AG, Germany
- **Prof. Fuyuki Ishikawa**
National Institute of Informatics and Sokendai University, Japan
- **Dr. André Stollenwerk**
Embedded Systems Institute, RWTH Aachen, Germany
- **Prof. Manabu Kano**
Department of Informatics, Kyoto University, Japan
- **Prof. Valentina Colla**
Scuola Superiore Sant'Anna, Italy
- **Dr. Satoshi Otsuka**
Hitachi R&D, Mobility and Automation Innovation Center, Japan
- **Dr. Martin Hollender**
ABB Corporate Research Center, Germany

17:00 – 17:10

CLOSURE

- **Prof. Sebastian Engell**
TU Dortmund
- **Nobuo Nukaga**
Hitachi R&D

17:10 – 18:15

RECEPTION AND BILATERAL DISCUSSIONS

Event information	
Event name (and acronym)	Annual Iron and Steel technology Conference and Exposition AISTech 2025
Type of event	Conference and Exhibition
Date	May 5-8, 2025
Location	Nashville, TN, USA
Geographic coverage	World
Type of audience	Steel Companies, OEMs, RTOs, Academia.
Approximate size of audience	8080
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	Intelligent Steel Expert: Let the Sensors Think, So You Can Thrive!
Presenter	Vittorio Scipolo (Tenova goodfellow Inc.)
Other partners involved	SSSA
Hashtag(s) for Social Media	#metallurgy #digitalisation #IndustrialInnov #FutureLowEmissionsIndustries #RFCS #artificialintelligence #machinelearning #EAF #sustainability #TwinTransition #safety #situationawareness #training #CleanSteel
Attachments (e.g. agenda, invitation)	Detailed program available online at https://aistech.secure-platform.com/site/gallery?roundId=82011

Event information	
Event name (and acronym)	ESTEP Spring Dissemination Event 2025
Type of event	Conference
Date	June 5-6, 2025
Location	Kracow, Poland
Geographic coverage	Europe
Type of audience	Steel Companies, OEMs, RTOs, Academia.
Approximate size of audience	55
Short description	This is one of the two dissemination events organised by ESTEP each year to disseminate ongoing public-funded and private research activities at both National and International level, which are of interest for the European steel community. The 2025 edition paid a strong attention on the human factors and on solutions and tools to improve works conditions, attract new talents, and upskill or re-skill workers. One full session was devoted to digital solutions for the steel sector.
Information about dissemination activity	
Presentation title	Eyes on Steel: AI-Powered Monitoring for Enhanced EAF Safety and Efficiency
Presenter	Marco Vannucci (SSSA)
Other partners involved	TENOVA
Hashtag(s) for Social Media	#metallurgy #digitalisation #IndustrialInnov #FutureLowEmissionsIndustries #RFCS #artificialintelligence #machinelearning #EAF #sustainability #TwinTransition #safety #situationawareness #training #CleanSteel
Attachments (e.g. agenda, invitation)	Program of the event



The European Steel Technology Platform (ESTEP) **Spring Dissemination Event 2025** will take place in-person on **05 & 06 June 2025** in Krakow (Poland) at the Galaxy Hotel (Gęsia 22A, 31-535 Kraków).

Optional : A visit of the **Ogniochron factory** (in Andrychów) is foreseen on Friday 06 June 2025 (in the morning).

The main purpose of the event is to share results and knowledge gained from research & innovation projects related to the steel sector.

The topics will cover projects from RFCS, Clean Steel Partnership (CSP), other EU or national projects, etc., with a particular focus on digitalisation and people aspects.

More information about logistics & registration: available on the [event webpage](#)

PROGRAMME

DAY 1 – 5 June (part I)

SESSION 1 & 2

- 07:45 – 08:30 Registration
- 08:30 Welcome & opening *Klaus Peters (ESTEP)*
- 08:40 Steel policy overview (title tbc) – *Jürgen Tiedje (European Commission DG RTD E3)*
- 08:55 – 10:55 **1st session: Decarbonisation topics – Agnieszka Morillon**
- 08:55 Polish steel sector: main facts – *Marta Zagorska (Polish Steel Association)*
- 09:10 ArcelorMittal Poland: existing investments and decarbonisation plans – *Aleksandra Kania (ArcelorMittal Poland)*
- 09:25 Synergies between RFCS Projects on Hydrogen application in the Blast Furnace process – *Hauke Bartusch (BFI)*
- 09:40 Investigation of the use of hydrogen as reducing agent in the Direct Reduction of low-grade iron ore pellets – *Claudia Sergi (RINA-CSM)*
- 09:55 MaxH2DR - Maximise H2 Enrichment in Direct Reduction Shaft Furnaces – *Thorsten Hauck (BFI)*
- 10:10 Production of the highest quality cast steel using the AOD converter process – *Artur Zak (Łukasiewicz – GIT)*
- 10:25 Turning biowaste into steel-grade biocoal to decarbonize the steelmaking process – *Andrea Salimbeni (RE-CORD)*
- 10:40 Energy Balanced Technology for Recycling Iron Oxide Waste in the EAF Process – *Alicja Szemalikowska (Łukasiewicz – GIT)*
- 10:55 – 11:15 Coffee break
- 11:15 – 12:45 **2nd session: People topics – Michael Kohlgrüber**
- 11:15 Empowerment and Recruitment of People in the Steel Industry – *Antonius Schröder (TU Dortmund)*
- 11:30 SUPER project: Sustainable future steel production and people recruiting and skilling – *Thorsten Hauck (BFI)*
- 11:45 Hubs for Circularity in Europe: focus on stakeholders – *Karina Maldonado-Mariscal (TU Dortmund)*
- 12:00 SkillMine : a dynamic AI-Powered Skills Mining Engine with industry specificity to identify emerging trends and changing skills needs – *Andrew Barker (Steeluniversity)*
- 12:15 Artificial Intelligence in steel production: Questions of augmentation, optimisation and accountability – *Dean Stroud (Cardiff University)*
- 12:30 Digitalisation: The Universal Environmental Data model - the PRISMA project – *Jerker Delsing (LTU)*
- 12:45 – 13:45 Lunch break
- 13:45 Research Fund for Coal and Steel: future funding opportunities – *Sebastiano Fumero (European Commission, REA)*
- 14:00 – 16:35 **3rd session: Decarbonisation topics – Jarosław Marcisz**

PROGRAMME

DAY 1 – 5 June (part II)

SESSION 3 & 4

14:00 – 16:35 3rd session: Decarbonisation topics – *Jarostaw Marcisz*

- 14:00 Power4Steel with MemKoWI – CO₂- & H₂-separation from process gases by advancing membrane technology R&D to pilot testing – *Susanne Bethlehem-Seidel (Dillinger)*
- 14:15 Resurgence project - Supporting the green and digital transition of the EU processes industries – *Krzysztof Grzybowski (CELSA Poland)*
- 14:30 TransZeroWaste - Upgrading of low-quality iron ores and mill scale with low carbon technologies – *Gerald Stubbe(BFI)*
- 14:45 Safe H-DRI - Safe handling and transport of hydrogen-based direct reduced iron for a decarbonisation of the steel industry – *Melanie Leitner (K1-MET)*
- 15:00 Eyes on Steel: AI-Powered Monitoring for Enhanced EAF Safety and Efficiency – *Marco Vannucci (SSSA)*

- 15:15 Development of a technology of manufacturing of welding pipes made of multiphase steels CP and DP – *Lukasz Poloczek (Łukasiewicz – GIT)*
- 15:30 Overview of the first one and a half years of the Horizon EU project H2PlasmaRed – *Henri Pauna (University of Oulu)*

15:45 – 16:05 Coffee break

- 16:05 Effect of Hydrogen combustion atmosphere on the properties of steel surface scale – *Filippo Cirili (RINA-CSM)*
- 16:20 HBI C-Flex – Reoxidation behaviour and stability of direct reduced and hot briquetted iron with variable iron and carbon content – *Melanie Leitner (K1-MET)*

16:35 – 17:35 4th session: Digitalisation topics – *Akhilesh Swarnakar*

- 16:35 DIGREES - Demonstration of digital twins for a green steel value chain – *Madalina Rabung (Fraunhofer)*
- 16:50 AI-Driven Copper Detection in Scrap Metal: Advancing Digitalization in Sustainable Steelmaking (PURESCRAP) – *Marco Vannucci (SSSA)*
- 17:05 Integrated modelling for sustainable and optimized steel manufacturing processes (ProcTwin project) – *Tania Irebo Schwartz (SWERIM)*
- 17:20 Enhanced Steel Production Efficiency Through Fuzzy Logic Aided Genetic Algorithms – *Marco Vannucci (SSSA)*

- 17:35 Closing comments & future perspectives – *Klaus Peters (ESTEP)*
- 17:45 End of conference

- 19:30 Dinner at Galaxy Hotel

DAY 2 – 6 June

08:00 – 13:00 Optional visit of the Ogniochron factory (Przemysłowa 42, Andrychów, Poland))

A bus will depart from the Galaxy Hotel at 8h, and will be back around 13h at the Galaxy Hotel.

The maximum number of participants for the plant visit is up to 45 people. The participants will be divided into 3 groups of 15 people. Duration of the visit approximately 2h (from 9h30 - 11h30).

7. Appendix II: English translation of the press release issued on *Machine Production and Fluids and Lubricants*

iSteel-Expert: a year of progress for sustainable steelmaking

After a year of development, Tenova, the Italian partner of the iSteel-Expert project, presents the advances of a digital twin designed to optimize steel production. With the support of AI and IoT, this system promises to transform steel practices by combining efficiency, safety and sustainability.

Launched in July 2023, the iSteel-Expert project is part of a European programme to support initiatives in the steel sector towards more sustainable practices. After a year of work, one of its partners, the Italian Tenova, has drawn up an initial assessment. The company from Castellanza, northern Italy, which specialises in the development and supply of sustainable solutions for the green transition of the metallurgical industry, is working on the creation of a digital twin capable of operating, in an industrial environment, at a Technology Readiness Level (TRL) of 7. This measurement system is used to assess the level of maturity of a technology, on a scale of 1 (weak) to 9 (strong).

"This intelligent system aims to continuously monitor the production process, analyze the data collected to generate relevant key performance indicators (KPIs), and suggest corrective or improvement actions to optimize steel production," says Tenova, accompanied by five partners, the Italian steel producer Siderpotenza, the School of Digital Technology of the Catholic University of Lille, the Santa Anna School of Advanced Studies in Pisa (Italy), the University of La Rioja (Spain) and SIM4future, a spin-off of the University of Genoa (Italy).

Its function is to collect and then analyze information from the electric arc furnace, recently installed by Tenova in the Siderpotenza plant. "By significantly improving the quality of the data needed for operator decision-making, iSteel-Expert will support standard and maintenance operations. Thanks to artificial intelligence (AI) and the Internet of Things (IoT), the system will be able to detect and analyze critical events and their consequences, thus allowing a quick and efficient intervention to maintain and improve production," explain Isabella Marchese, consultant in R&D and innovation projects, and Jalal Possik, director of the Digital School of the Catholic University of Lille, who co-sign Tenova's press release.

Using Virtual Reality

According to the two experts, in addition to monitoring and analysing production processes, iSteel-Expert will adopt a knowledge-based approach, integrated into an immersive and interactive training tool developed by the project's academic partners, working closely with the industrial partners to meet their specific needs. Also described as an innovative training tool, the project will rely on augmented reality and virtual reality to promote the conservation, transfer and continuous evolution of know-how. "This method will significantly reduce the time needed to train employees, while minimizing their exposure to potentially hazardous environments," Marchese and Possik said, adding that "operators will be able to learn critical skills in a safe virtual environment before applying them in the real world."

The use of data and KPIs, combined with these new training processes, will not only help improve the efficiency of production facilities, but also promote workers' well-being by limiting their exposure to

hostile conditions, say the participants in the iSteel-Expert project. He said that by providing data-driven recommendations to optimize operations, "the system will reduce the risk of human error and increase overall productivity".

"A clear commitment to innovation"

For the iSteel-Expert players, this project represents a significant step forward in the integration of technology for more sustainable steel production that respects the working conditions of employees. "By bringing together partners from diverse backgrounds and combining advanced technologies such as AI and IoT, iSteel-Expert is paving the way towards a more efficient, secure and environmentally responsible metallurgical industry," comment the two experts, for whom this project demonstrates "a clear commitment to innovation, sustainability and safety, offering a model for the future of industrial production". It should be noted that this project is co-financed by the Coal and Steel Research Fund (RFCS).

8. Appendix III: English translation of the press release issued on the Corporate Magazine of the Pittini Group.

DIGITALISATION AND STEELMAKING

Digital transformation in the steel industry: the iSteel-Expert project

A research project that aims to optimize efficiency, sustainability, and safety in steel production using artificial intelligence and automation. We explored the topic with Giuseppe Satriano, Vincenzo Orlando, and Silvia De Sio, who are involved in implementing the project at the Siderpotenza steelworks.

What are the main goals of iSteel-Expert?

Giuseppe Satriano: iSteel-Expert is a project co-funded by the European Union, involving several partners (Siderpotenza, Tenova, Scuola Superiore Sant'Anna, SIM4Future, Lille Catholic University, Universidad de La Rioja) and aims to improve steel production through advanced technologies. One of the main objectives of the project is to preserve and develop the company's know-how. This is achieved by digitizing the experience of the most qualified operators and transforming it into an interactive platform that uses gaming dynamics to facilitate learning.

Vincenzo Orlando: In addition, iSteel-Expert aims to optimize the efficiency of the melting process and the equipment used, thanks to the use of artificial intelligence (AI). By analysing casting data, the system provides real-time information useful for continuously improving the melting process, ensuring compliance with the required performance parameters (KPIs, Key Performance Indicators). AI also helps operators to quickly identify any plant problems and implement the most effective countermeasures to avoid repercussions.

Silvia De Sio: Another crucial aspect of the project is operator safety. iSteel-Expert reduces the need for direct intervention on the machine during the production cycle, thus improving workers' safety.

What are the main stages of the project?

G.S.: The project is divided into seven complementary and interconnected phases (work packages, WP), with a total duration of 36 months. Each phase has specific objectives.

Initially, we installed sensors and equipment, defined performance indicators (KPIs), and analyzed the requirements for the training system (WP1). Then, we worked on the infrastructure to collect and analyze data from the plants (WP2). Next, we developed algorithms to identify critical events during melting and suggest corrective actions (WP3). Another important part is the creation of teaching tools to train operators (WP4). Finally, we are testing the system in the field to evaluate its effectiveness and applicability elsewhere (WP5), disseminating the results obtained (WP6), and managing the overall coordination of the project to ensure that everything is completed successfully (WP7).

What technologies are being adopted to improve steel production?

V.O.: First, sensors specially designed to withstand the demanding environmental conditions of steel mills have been installed. These sensors collect real-time data from different sources and in different

formats. The data is then sent to a local pre-processing station, which analyzes it to extract the most relevant information, such as video, acoustic, vibration, and temperature signals, thus reducing the amount of data transferred to the central system.

S.D.S.: At the heart of the project is a cloud infrastructure that processes this data using advanced algorithms, including machine learning (a system that analyzes historical data to optimize production processes and predict future events), to generate KPIs and other useful information. These results are presented in a clear and easily understandable way via dashboards accessible online.

What are the expected benefits for companies, especially in the particular case of Siderpotenza?

G.S.: iSteel-Expert introduces a virtual system capable of monitoring the steel production process 24 hours a day, 7 days a week, thus functioning as a “virtual expert.” It uses IoT (Internet of Things) technologies (a network of connected devices that collect and share data in real time), helping operators to optimize and correct operations. The system provides suggestions for improving the quality of information coming from the furnace and supports operational decisions and maintenance. It also detects any problems in a timely manner, analysing causes and consequences.

Given the crucial role of training in this project, how does iSteel-Expert contribute to the development of company know-how and the preparation of operators?

S.D.S.: iSteel-Expert's main objective is precisely the preservation and evolution of company skills. By digitizing the knowledge and experience of the most experienced operators, we avoid the loss of know-how and enhance internal skills. In addition, through the use of advanced data and KPIs, combined with innovative training based on interactive simulations and gaming techniques, we offer a modern solution for training new generations of workers.

Another central aspect of this project is sustainability. How does iSteel-Expert contribute concretely to reducing the environmental impact of steel production?

V.O.: iSteel-Expert contributes to making production more sustainable thanks to its various features. The system monitors electrodes, manages slag, optimizes basket loading, and detects vibrations. These operations reduce energy consumption, decreasing both fume and noise emissions, thus improving acoustic comfort within the plant and in the surrounding areas. Data collection and analysis also helps managers and operators make faster and more targeted decisions, thus reducing the environmental impact of production, maintaining high product quality, and ensuring the proper functioning of the plants.

9. Appendix IV: English translation of the press release issued on the newspaper *Il Tirreno*.

The European steel industry is facing the so-called "twin transition." On the one hand, the ecological transition implies the implementation of low-carbon technologies, for example those that involve the use of hydrogen as an energy source or as a "reducing agent" that makes it possible to obtain "metallic" iron from minerals in which it is naturally contained in the form of oxides. On the other hand, the digital transition is about integrating advanced technologies, such as artificial intelligence and the Internet of Things, to optimize production, improve quality, and increase operational efficiency. The ultimate goal is to respond to climate challenges and ensure competitiveness and innovation in the sector, promoting sustainable and resilient growth for the future. The intersection of the two transformation processes is profound and sees Artificial Intelligence (AI) at the forefront to support more sustainable production processes in the most comprehensive meaning of the term, which embraces the environmental, economic and social dimensions.

The Sant'Anna School of Advanced Studies collaborates with many international companies and research organizations in the context of numerous research initiatives at European level that use AI tools to support the transformation of the steel industry.

As part of the project entitled *"Data and decentralized Artificial intelligence for a competitive and green European metallurgy industry"* (ALCHIMIA),³ a system is developed that determines the optimal mix of scrap steel with which to load the electric arc furnace, which remelts it to generate new steel. The optimization criteria aim to reduce the environmental impact of the entire cycle while preserving the quality of the final product. To this end, the Sant'Anna School's researchers developed process models based on neural networks to be fed into a machine learning system called a "federated", which allows different devices or servers to collaborate to train a model without having to share the data that is collected for this purpose. It is therefore possible to extend the benefits of AI to different companies by creating models collaboratively, keeping company data safe and secure.

In the project entitled *"Purity improvement of scrap metal"* (PURESCRAP),⁴ the Sant'Anna researchers use AI to inspect scrap steel through a multisensory system before use in the production chain in order to identify unwanted materials, such as copper components, so that they can be discarded. A system of this type allows both to improve the quality of the product and to intensify the use of scrap (even at low level) instead of virgin raw material, especially in the production of types of steel with more stringent quality requirements, achieving significant advantages in environmental and economic terms. In addition, this system favours the implementation of that concept of "circular economy" that is very popular today but in fact inherent in steel production since its historical origins, since end-of-life components are used to produce new steel.

Finally, the project *"Remote expert virtual system enhancing human management capabilities and favors preservation, transfer and continuous evolution of knowledge for steelmaking operations"* (iSteel-Expert)⁵ aims to create a "remote virtual expert" in an industrial environment, i.e. a system that monitors the progress of the scrap smelting process 24/7, analyzes the information provided by a set

³ <https://alchimia-project.eu/>

⁴ <https://www.purescrap.eu/>

⁵ <https://www.isteel-expert.eu/>

of sensors, including cameras and microphones, and suggests actions to improve and/or correct steelmaking operations. In this context, AI is used to jointly process and interpret different sensory data, including images and sound signals, to improve the management skills of operators, promptly detect anomalous or significant events and identify their consequences. This system improves the safety of the working environment, as it reduces both the risks and the level of stress associated with operations. In addition, it also supports the preservation, transfer and continuous evolution of the company's knowledge heritage as it includes an interactive immersive training tool.

From the examples mentioned above, there is a strong interest in the European steel industry for the use of AI that still plays a central role for humans. Operators are supported in carrying out daily tasks and decision-making processes and can use a flow of heterogeneous information deriving, for example, from sensors of different types, which is constantly growing and which without AI it would not be able to manage. In short, it is a "friendly" AI, a collaborator and not a competitor of companies and their employees.