

# **Programme**

**EASES 2025**

**6<sup>th</sup> European Academic Symposium on  
EAF Steelmaking**



**11 – 13 June 2025  
Ljubljana, Slovenia**

## Greetings from the chairs

It is our great pleasure to welcome you to the 6<sup>th</sup> European Academic Symposium on EAF Steelmaking – EASES 2025. This symposium is proudly organized by the Laboratory of Control Systems and Cybernetics at the Faculty of Electrical Engineering, University of Ljubljana, and the Department for Industrial Furnaces and Heat Engineering at RWTH Aachen University.

As the steel industry continues to evolve, facing the global energy and environmental challenges, the role of the EAFs has never been more crucial. This symposium provides a unique opportunity for students, researchers, as well as industry professionals to exchange ideas, share their research, and promote collaborations aimed at enhancing the performance, efficiency, and sustainability of the EAF steelmaking.

Our program brings together experts in different fields of engineering, and different parts of the globe, not only Europe — all converging on the shared goal of driving forward the capabilities of EAF technology. Through a series of technical sessions, and interactive discussions, participants will explore the latest developments and future directions in this dynamic field.

We are pleased to host this event in Ljubljana, a city known for its charm, green spaces, and vibrant cultural life. As the capital of Slovenia and home to its largest university, Ljubljana has a strong identity as a student and academic city. With a lively atmosphere, it offers a welcoming environment for innovation, and an exchange of ideas. We encourage you to take time to explore its historic old town, riverside cafés, and the unique blend of tradition and modernity that define it. We extend our sincere thanks to all speakers, and attendees who make this symposium an excellent place for knowledge exchange.

We look forward to insightful conversations, new collaborations, and continued progress in the field of EAF steelmaking.

Welcome to Ljubljana, and to the EASES 2025.

**Asst. Prof. Vito Logar**  
**Co-chair**

**Dr.-Ing. Thomas Echterhof**  
**Co-Chair**



## Locations

### Conference venue

Faculty of electrical engineering, University of Ljubljana (Lecture room P2)

[Tržaška 25](#)

Ljubljana, Slovenia

### **Get-together (Wednesday, 11 June at 18:00)**

Solist Urban Lounge

[Kongresni trg 10](#)

Ljubljana, Slovenia

### **Dinner (Thursday, 12 June at 18:00)**

Dinner will be held at Gostilna na gradu (Ljubljana castle). We will use the funicular to get there. **The meeting point is at:**

[Krekov trg](#)

Ljubljana, Slovenia

# Programme

## Wednesday, 11 June 2025

18:00      **Get together**  
Solist Urban Lounge, Kongresni trg 10, Ljubljana, Slovenia

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## Thursday, 12 June 2025

8:00      Registration open

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9:00      **Welcome to EASES 2025**  
*Vito Logar*

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**Session on EAF modelling, simulation and efficiency 1**  
*Session chair: Ville-Valtteri Visuri*

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9:20      **Model Development about the Composition of Scrap in Electric Arc Furnace**  
*Yiqing Zhou, Karsten Naert, Dirk Nuyens*

9:40      **Application of an artificial neural network to estimate the off-gas generation within an EAF under modified operating conditions**  
*Alexander Reinicke, Lilly Schulte, Thomas Echterhof*

10:00      **An Integrated CFD Modeling Approach Towards an Entire EAF Operation Process**  
*Chenn Zhou, Orlando Ugarte, Tyamo Okosun, Shiyu Wang, Sathvika Kottapalli*

10:20      **Foam-Arc Interaction in Electric arc Furnace: Insights into Flow, Stability, and Thermal Behaviour**  
*Mohamad Al Nasser, Ebrahim Karimi Sibaki, Menghuai Wu, Anton Ishmurzin, Gernot Hackl, Nikolaus Voller, Christian Redl, Harald Holzgruber, Kharicha Abdellah*

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10:40      Coffee break

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**Session on EAF modelling, simulation and efficiency 2**  
*Session chair: Thomas Echterhof*

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11:00      **From Air to Hydrogen: 3D Models of Electric Arcs in Sustainable Steelmaking**  
*Mohamad Al Nasser, Ebrahim Karimi Sibaki, Menghuai Wu, Anton Ishmurzin, Gernot Hackl, Nikolaus Voller, Christian Redl, Harald Holzgruber, Kharicha Abdellah*

11:20	<b>Dissolved Oxygen Estimation in an Electric Arc Furnace Using a Soft Sensor Approach and Prediction Intervals</b> <i>Aljaž Blažič, Igor Škrjanc, Vito Logar</i>
11:40	<b>AI-Driven Benchmarking for EAF Performance</b> <i>Ensophea Toch, Pakrigna Long, Sokroeur Ang</i>
12:00	Lunch
	<b>Session on EAF modelling, simulation and efficiency 3</b> <i>Session chair: Vito Logar</i>
13:00	<b>A Data-Driven Approach to Scrap Charging Optimization in Electric Arc Furnaces</b> <i>Siddharth Nachankar, Sourjya Naskar, Thomas Echterhof, Mikko Jokinen, Christian Wuppermann</i>
13:20	<b>Improvement of EAF process management with new concepts of modelling monitoring and control of the process in order to improve process efficiency, source consumption and environmental impact</b> <i>Piero Frittella, Lorenzo Angelini, Massimiliano Bersani, Christian Senes, Cosmo di Cecca, Vincenzo Duro, Gioele Badina, Gabriele Mazzi, Giuseppe Miglietta, Salvatore Conte</i>
13:40	<b>Influence of thermodynamic and kinetic parameters on steel dephosphorization efficiency in electric arc furnace</b> <i>Diego Darvy Moreira, José Roberto de Oliveira</i>
14:00	<b>Optimizing Electric Arc in Electric Arc Furnace: An Arc Quality Index Based on Cassie-Mayr Modeling</b> <i>Aljaž Blažič, Igor Škrjanc, Vito Logar</i>
14:20	Coffee break
	<b>Session on Slag and byproducts engineering, processing and valorization</b> <i>Session chair: Davide Mombelli</i>
14:40	<b>Zinc Recovery from Flue Dust of Arc Furnace Plants in Pilot-Scale Waelz-Oxide Process</b> <i>Erhan Yavaşçı, Bilal Daglar</i>
15:00	<b>Upcycling pathway for Electric Arc Furnace slag: utilization as reinforcing fillers for polymers</b> <i>Giulia Braggia, Carlo Boaretti, Luca Patriarca, Timur Nikitin, Alessandra Primavera, Giuseppe Giacomini, Silvia Gross</i>

- 15:20      **Iron Recovery from Waelz Slag through Biogenic Carbothermic Reduction**  
*Gianluca Dall'Osto, Davide Mombelli, Sara Scolari, Carlo Mapelli*
- 15:40      **Quantitative phase analysis in carbon steel EAF slag for the determination of phase-controlled leaching mechanism**  
*Sara Scolari, Davide Mombelli, Gianluca Dall'Osto, Carlo Mapelli*
- 16:00      **Reduction and Smelting of Magnetic Fraction Obtained by Magnetic-Gravimetric-Separation of Electric Arc Furnace Dust**  
*Davide Mombelli, Sara Scolari, Gianluca Dall'Osto, Jasna Kastivnik, Dragan Radulović, Gašper Tavčar, Carlo Mapelli*
- 16:20      **Smelting of various steel-plant dusts to evaluate recovery of zinc and iron via the Enviropilas process**  
*Sello Tsebe, Sanda Moloane, Habib Zughbi, Deside Chibwe, Peter Austin, Dursman Mchabe, Mukhethwa Netshia, Derek Hayman, Elias Matinde*
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- 18:00      Dinner at Gostilna na gradu  
Including the award presentation
- Meeting point: Krekov trg**



## **Friday, 13 June 2025**

9:00      **Opening of day 2**  
*Thomas Echterhof*

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**Session on Fossil-free raw materials**  
*Session chair: Ville-Valtteri Visuri*

9:10      **Kinetic Modeling of Hematite Reduction by Hydrogen Plasma Smelting Reduction in laboratory scale**  
*Areej Javed, Ilpo Mäkelä, Henri Pauna, Henna-Riikka Putaala, Ubaid Manzoor, Dennis Klapproth, Isnaldi R. Souza Filho, Ville-Valtteri Visuri*

9:30      **Mass and energy based modelling of EAF steelmaking scenarios using scrap and hydrogen reduced DRI as raw materials**  
*Eetu-Pekka Heikkinen, Petri Sulasalmi, Ville-Valtteri Visuri, Seppo Ollila, Jarmo Lilja*

9:50      **Optimization Based Experimental Design of Metal-Slag Experiments in Hydrogen Plasma Smelting Reduction Process**  
*Tero Vuolio, Ville-Valtteri Visuri, Michael Zarl, Iivari Lappeteläinen*

10:10     **A Novel Approach for Modeling the Thermal Properties of H-DRI during Melting in an Electric Arc Furnace**  
*Ankur Agnihotri, Petri Sulasalmi, Ville-Valtteri Visuri*

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10:30     Coffee break

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**Session on Process control and sensors**  
*Session chair: Vito Logar*

10:50     **Implementation of an At-Line Slag Analyzer – Advantages and Challenges**  
*Alexander Schlemminger*

11:10     **Development Of Measuring Technologies For Carbon-Lean Hydrogen-Plasma Smelting Reduction Process**  
*Kunwar Shivam Pratap, Kendall Martin, Michael Zarl*

11:30     **Interval Model Predictive Control of Bath Temperature in an Electric Arc Furnace**  
*Aljaž Blažič, Igor Škrjanc, Vito Logar*

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11:50     Lunch

## **Session on CO<sub>2</sub> emission reduction and environmental impact 1**

*Session chair: Davide Mombelli*

- 13:00      **Scope 3 emissions in secondary steelmaking: relevance and impact on CFP**  
*Luca Testini, Alessandro Misul, Vincenzo Morreale, Philippe Brocard, Livia Persico, Davide Mombelli, G Dotelli*
- 13:20      **Scope 3 emissions in secondary steelmaking: relevance and impact on organization carbon footprint**  
*Luca Testini, Alessandro Misul, Vincenzo Morreale, Philippe Brocard, Livia Persico, Davide Mombelli, G Dotelli*
- 13:40      **Using a Novel Scaled Injector to Evaluate Biocarbon for Slag Foaming in EAF Steelmaking**  
*Christopher DiGiovanni, Tiago Fernandes Lins, Michael Strelbisky, Majid Zamani, Allan Runstedtler, Colin Scott*
- 14:00      **Decarbonization and New Energy-Efficient Technologies for EAF Steelmaking**  
*Hamzah Alshawarghi, Joachim von Schéele*

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14:20      Coffee break

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## **Session on CO<sub>2</sub> emission reduction and environmental impact 2**

*Session chair: Thomas Echterhof*

- 14:40      **Results from the Experimental Campaigns with the H<sub>2</sub> Oxyfuel Burner for Electric Arc Furnaces**  
*Eros Luciano Faraci, Irene Luzzo, Jacopo Greguoldo, Fabio Vecchiet, Giulio Rinaldi, Fabiano Ferrari, Federico Nastro, Daniele Gaspardo, Lilly Schulte*
- 15:00      **Use of hydrogen as energy source in EAF**  
*Pascal Kwaschny, Marianne Magnelöv, Erik Sandberg*
- 15:20      **Numerical Investigation of Hydrogen Blending on the Impinging Flame Structure in Non-Premixed CH<sub>4</sub>/H<sub>2</sub>/Air combustion for Scrap Metal Heating**  
*Gopal Pandey, Geoffrey Brooks, Jamal Naser, Daniel Liang*

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15:40      End of symposium



## Contact

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# Organizers

## Chairs

Asst. Prof. Vito Logar, University of Ljubljana

Dr.-Ing. Thomas Echterhof, RWTH Aachen University

## Organizing committee

Prof. Igor Škrjanc, University of Ljubljana

Asst. Prof. Simon Tomažič, University of Ljubljana

Dr. Goran Andonovski, University of Ljubljana

Dr. Aljaž Blažič, University of Ljubljana

Asst. Prof. Vito Logar, University of Ljubljana

Dr.-Ing. Thomas Echterhof, RWTH Aachen University

## Scientific Committee

Dr. Matti Aula, University of Oulu

Dr.-Ing. Thomas Echterhof, RWTH Aachen University

Asst. Prof. Vito Logar, University of Ljubljana

Assoc. Prof. Davide Mombelli, Politecnico di Milano

Assoc. Prof. Ville-Valtteri Visuri, University of Oulu



**FE**

UNIVERSITY OF LJUBLJANA  
Faculty of Electrical Engineering



Department for  
Industrial Furnaces  
and Heat Engineering

**RWTHAACHEN**  
UNIVERSITY