

SYMPOSIUM ON INTELLIGENT MANUFACTURING



General Chairs: Dr. Yuming Zhang (USA) and Dr. Stephan Egerland (Austria)

Program Chair: Dr. Edward Wang (USA)

Secretaries: Dr. Jun Xiao (China) and Dr. Elisabetta Sciaccaluga (IIW)

16 July 2026

8:30am-8:40am: Opening

8:40am-10:10am: Keynote Session (Room: Mozart; Chair: Yuming Zhang)

Keynote 1: Beyond Task-Specific Automation: Scalable AI and Physics-Informed Control for Generalizable Robotic Welding, by Dr. Hai Lin (USA)

Keynote 2: Physics-Informed Neural Networks -- Promises, Pitfalls, and Applications in Welding, by Dr. Bernhard Geiger and Dr. Franz Rohrhofer (Austria)

10:10am-10:30am: Morning Break

10:30am-12:10pm: Morning Parallel Sessions

Intelligent Additive Manufacturing, WAAM, Digital Twins, and Qualification (Room: Mozart 1; Chair: Giulio Mattera)

1. (Invited Talk) Qualification-Oriented Monitoring of an Aluminium 4043 Aerospace Component Manufactured by REACT-Based Wire Arc Additive Manufacturing
Authors: Giulio Mattera; Elena Manoli; Yushuai Che; Luigi Nele
2. (Invited Talk) Real-time prediction of temperature field during welding by data-physical driving
Authors: Wenhua Jiao
3. Preliminary Study on AI-Assisted Microstructure Prediction in Wire Arc Additive Manufacturing of Austenitic Stainless Steel for Fusion Divertor Applications

Authors: Gitae Park; Kyoung-Hwan Kim; Dongjin Oh; Jun Young Park; Yongjoon Kang; Chan Kyu Kim; Sang Woo Song

4. A Stochastic Digital Twin for Layer-wise Geometry Prediction and Deposition Planning in WAAM

Authors: Elena Manoli; Giulio Mattera; Luigi Nele; Yushuai Che

5. Deep Learning-Based Residual Stress Generation for Nuclear Piping Integrity
Authors: Jun-Young Jeon, Chang-Young Oh, Sang-Woo Song

Industrial AI Deployment, Digital Decision Support, and Workforce Development (Room: Mozart 2; Chair: Huabin Chen)

1. Centralized Weld Data Monitoring System for Predicting & Preventing Defects in Shipyards Using AI & ML

Authors: Jithesh Parol Kundantavide

2. In-Mask Augmented Reality for Real-Time Welding Telemetry and SWaN-Driven Defect Prediction

Authors: Joselito Yam Alcaraz; Rémy Lenaerts; Tegoeh Tjahjowidodo

3. A post phenomenological study of posthuman andragogical frameworks and AI adoption in adult welding education and training in India

Authors: Payel Chowdhury

4. Bridging Skills Gaps in Industry 5.0: Aligning AI-supported Competencies Development in Energy-Intensive Industries and Additive Manufacturing

Authors: Ana Luísa Marques; Begum Canaslan

5. Multimodal Process Sensing and Robust Decision-Making for Welding Based on Analytical Heat-Source Priors

Authors: Huabin Chen

Robotic Welding, Human-Robot Collaboration, and Intelligent Assistance (Room: Mozart 3; Chair: Yongzhe Li)

1. (Invited Talk) AI-Based In-Process Assistance Technology via Preceding Molten Pool Detection from Welder's Perspective Images

Authors: Yuya OKAMOTO; Tadahisa TSUYAMA; Kohei FUJIWARA; Atsushi HAYASHI

2. Redundant robot trajectory planning and tracking control for complex welding tasks: The Sim2Real method integrating model-driven and reinforcement

learning

Authors: Yijun Zhou; Yongzhe Li

3. An Improved Human-Robot Collaborative Welding System
Authors: Yize Chen; Yue Cao; Qiang Ye; Yuming Zhang
4. A Human Cooperative Framework for Online Human-like Fine Torch Operation
Authors: Jun Xiao; Yijie Hu; Shujun Chen
5. Modeling and control of backside weld width for CMT root-pass welding of X65 pipeline at typical positions
Authors: Xiaobo Song, Zhichen Lin, Wei Xu, Weifeng Li, Junheng Wang, Zhijiang Wang, Shaojie Wu, Caiyan Deng

12:10pm-13:20pm: Lunch Break

13:20pm-14:00pm: Keynote Session (Room: Mozart; Chair: Edward Wang)

Keynote 3: Embodied Intelligent Robots for On-Site Welding: State of the Art, Key Technologies, and Future Prospects, by Dr. Shujun Chen (China)

14:10pm-15:50pm: Afternoon Workshop and Parallel Sessions 1

Workshop on Credible and Generalizable for Automotive Manufacturing: From Foundational Techniques to Deployment on the Shop Floor, by Edward Wang (Room: Mozart 1; Chair: Charalampos Loukas)

AI-Enabled Weld Inspection, Defect Detection, and Quality Classification (Room: Mozart 2; Chair: Xinghua Yu)

1. Automated Weld Visual Inspection in Shipyards Using AI, Machine Learning, and Vision Sensors
Authors: Jithesh Parol Kundantavide
2. Deep learning for weld defects segmentation in X-ray images of copper tube brazing structure
Authors: Dazhao Chi; Lihua Yang; Ziming Wang; Yuheng Liu; Jinxian Zhao

3. WLD-Net: Multimodal Future-Risk Prediction for Weld Radiographic Inspection Using Historical Image–Signal Windows
Authors: Xinghua Yu; Xuefeng Zhao
4. A Study on Defect Monitoring in Stainless Steel Laser Welding Processes Using a Multi-Sensor System (Photodiode and Infrared Thermal Camera)
Authors: Jeong Yeol Park; Changwook Ji; Seonghyun Kim
5. Development of Preprocessing Pipeline for BOS Imaging and Its Application to ResNet18-based Laser Welding Quality Classification
Authors: Sanghoon Kang; Jaekyung Cho; Minseo Kim; Minjung Kang; Jaewon Yang

Physics-Informed AI, Process Modeling, and Materials Optimization (Room: Mozart 3; Chair: Rui Yu)

1. (Invited) Investigation of Defect Formation Mechanisms and Porosity Characteristics in Laser-Arc Hybrid Welding of AA6N01-T5 via High-Speed Imaging and 3D-CT Analysis
Authors: Seong hyun Kim; JooYong Cheon; Changwook Ji
2. (Invited) Physics-Informed Generative Modeling of Weld Penetration Dynamics via a PINN–Transformer–GAN Framework
Authors: Rui Yu; Shipeng Cheng
3. Development and Optimization of a Parameter Recommended Model for Automotive Resistance Spot Welding
Authors: Yujun Xia; YunFan Zhou; JianNan Zhang; YongQuan Jia; YongBing Li; ZhongQin Lin
4. Precise Design of Interlayer and Process Parameters for Diffusion Bonding via Physics-Informed Deep Learning
Authors: Jiafen Song
5. Development of an Experimental Database for AI-Based Composition Optimization of Welding Filler Metals for Type XM-19 Stainless Steel
Authors: Hye-Eun Jeong; Gitae Park; Sangwoo Song; Yongjoon Kang; Jaeheon Lee; Young Hoon Lee; Seung Hwan Lee; Eun-Joon Chun

15:50pm-16:00pm: Afternoon Break

16:00pm-17:00pm: Afternoon Parallel Session 2

Real-Time Monitoring and Feedback Control (Room: Mozart 1; Chair: Sven-Frithjof Goecke)

1. Investigating the pre-requisites of a closed-loop control system for optimizing the GMA-DED process
Authors: Akshay Manoj Shahane; Götz-Friedrich Gottschalk; Prof. Dr.-Ing. Sven-Frithjof Goecke
2. Deep Learning-Based Prediction of Penetration Depth and Defect Diagnosis in Laser Welding for Cylindrical Battery Applications
Authors: Yeong Gil Jo; Seung Hwan Lee; Minjung Kang
3. Real-time control of penetration depth via CNN-based feedback in dissimilar Al-Cu laser welding under defocusing conditions
Authors: Sanghoon Kang; Minjung Kang; Young Hoon Jang; Cheolhee Kim; Jaewon Yang

Vision-Guided Positioning and Seam Tracking (Room: Mozart 2; Chair: Daehyun Baek)

1. Research on 3D Reconstruction and Trajectory Planning Method for Complex TIG Welding Components Based on Deep Learning
Authors: Yi Guo
2. A Study on Real-Time Seam Tracking Technology Based on Autoencoder-Enhanced Laser Vision Sensing
Authors: Daehyun Baek; Hyeong Soon Moon
3. Application of Rotating Arc Sensing-Based Seam Tracking and Endpoint Detection to FCAW Fillet Welding
Authors: Hyun Kyu Lim; Hyun Jun An; Jung Min Bae; Hee Keun Lee; Chang Sub Song

Vision-Guided Weld Path Recognition and Trajectory Planning (Room: Mozart 3; Chair: Shaojie Wu)

1. Intelligent Feature Recognition and Reconstruction of Multi-layer and Multi-pass Welds Based on Segmentation-guided Binocular Passive Vision
Authors: Baohua Chang; Yifeng Zhou; Dong Du
2. A Composite Vision-Based Method for Weld Path Compensation and Tungsten Electrode Positioning in Pipe MLMP TIG Welding
Authors: Shaojie Wu; Jinping Liu; Senyu Wang; Junfu Jiao; Fangjie Cheng

3. Prediction and optimization of weld bead geometry using a PSO-LFABC algorithm and electrical signal analysis in oscillating arc underwater narrow gap flux cored arc welding

Authors: Wenhong Li; Jiangsong Ma