

University Academic Curriculum Vitae

Personal information

MATTEO DE MARCHI

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Education since leaving school

- 2020-2024 – **Ph.D., Research Doctorate** in Advanced Systems Engineering, (XXXVI cycle) dissertation entitled “Reference Architecture for Digital Twin Modelling and Remote Control of Cyber-Physical Production Systems”, achieved with Honours.
- 2018 - 2020 – **M.Sc., Master of Science in Industrial Mechanical Engineering**, (Logistics and Production path), Free University of Bolzano, Double Degree program with Otto v. Guericke University Magdeburg (Germany).
- 2014 - 2018 – **B.Sc., Bachelor of Science in Industrial Mechanical Engineering** (Logistics and Production path), Free University of Bolzano;
- 2009-2014 – **Diploma di Liceo Scientifico Tecnologico**, Galileo Galilei High School, Bolzano;

Present appointment

(February 2024 – present)

Research Fellow at the Smart Mini Factory lab under the **START** project (Sustainable Data Driven Manufacturing), for the development and implementation of a Digital Twin application for the monitoring and self-optimization of technological, environmental, social, and economic sustainability metrics.

Professional experience

From / to	Job title	Name of Company	Responsibilities
July 2015 - June 2016	Intern	Würth s.r.l.	Prime occupation was the management of a consistent part of the company's catalogue, together

			with technical consultancy and sellers support.
October 2017 – January 2018	Trainee	Fraunhofer Italia Research s.c.a.r.l.	Main activity resided in the development of a communication protocol to be implemented in a IoT based CPPS demonstrator for Industry 4.0. The endeavour has been the core activity for the writing of my Bachelor thesis.
March 2020 – September 2020	Master student	Smart Mini Factory (unibz)	Main activity in the evaluation of cognitive ergonomics in human-robot collaborative workplaces (thesis work). Further testing and setup of a new AI-based 3D perception device in the Smart Mini Factory lab. Support in training activities for students (preparation of demonstration use cases) and companies (Handwerk 2020 Techparcour).
February 2021- February 2024	Research Fellow	Smart Mini Factory (unibz)	Research Fellow in the research project ETAT (Education and Training for Industry 4.0 in Thailand), carrying out administrative duties as well as

			practical and technical development endeavours.
February 2021- February 2024	Research Fellow	Smart Mini Factory (unibz)	Research Fellow in the research project ICARUS (An Innovative Higher Education Institution Training Toolbox to Effectively Address the European Industry 4.0 Skills Gap and Mismatches), collaborating in practical and technical development and dissemination activities.

Experience in academic teaching

- **Teaching Assistant** for exercise hours in the “**Production Planning and Industrial Logistics**” course (Bachelor in Industrial Mechanical Engineering, Free University of Bozen-Bolzano), academic year 2021/2022.
- **Teaching Assistant** for exercise hours in the “**Digital Manufacturing and Simulation**” course (Master in Industrial Mechanical Engineering, Free University of Bozen-Bolzano), academic year 2021/2022.
- **Teaching Assistant** for exercise hours in the “**Production Planning and Industrial Logistics**” course (Bachelor in Industrial Mechanical Engineering, Free University of Bozen-Bolzano), academic year 2022/2023.
- **Teaching Assistant** for exercise hours in the “**Digital Manufacturing and Simulation**” course (Master in Industrial Mechanical Engineering, Free University of Bozen-Bolzano), academic year 2022/2023.
- **Teaching assistant** in the course “**Production Planning and Industrial Logistics**” – Responsible of the exercise hours

about the use of Universal Robots collaborative systems academic year 2023-2024.

- **Teaching assistant** in the course “**Industrial Collaborative Robotics**” – Responsible of the exercise hours about the advanced use of Universal Robots collaborative systems, academic year 2023-2024.
- **Teaching Assistant** for exercise hours in the “**Digital Manufacturing and Simulation**” course (Master in Industrial Mechanical Engineering, Free University of Bozen-Bolzano), academic year 2023/2024.

Appointed academic courses for academic year 2024/2025:

- **Lecturer** in the “**AI Applications in Industry**” course (Master in Industrial Mechanical Engineering, Free University of Bozen-Bolzano), academic year 2024/2025.
- **Lecturer** in the “**Digital Manufacturing and Simulation**” course (Master in Industrial Mechanical Engineering, Free University of Bozen-Bolzano), academic year 2024/2025.

Innovative teaching formats/ methods

- **Introduction of modern software for practising digital company business processes in course exercises** (FlexSim simulation software; Thingsboard industrial IoT platform, Grafana for data visualization, Endian Switchboard for cybersecurity demonstrations in collaboration with Endian S.r.l.)
- **Lectures as dialog sessions instead of monologue-like dissussions:** lectures aim at actively involving students, not being “note takers” but “critical thinkers”.
- **Development of a Virtual/Online Lab Tour:** to give students during the pandemic the possibility to access the lab in a virtual way I developed with the help of Teaching Assistants a Virtual Lab Tour by using the software Matterport as a platform. The single demonstrators in the virtual 3D lab are interactive and students can watch video material or see additional explanations by clicking directly on the demo of interest. Link to the virtual lab tour: <https://my.matterport.com/show/?m=7TJk9Z5eoBf>.

- **Development and implementation of a mobile training unit for Industry 4.0** as follow-up of the Erasmus+ project ICARUS for conducting trainings and teaching on-site, e.g., at high schools or companies.
- **Exploitation of the learning factory teaching concept in unibz** through joint frontal lectures and exercises sessions in the Smart Mini Factory laboratory for Industry 4.0.

Supervision of Students

Master Theses:

- Co-supervisor of Master Thesis "**Co-supervisor of Master Thesis "Visual Analytics as Enabler for Human-Centred and Data- Driven Decision-Making in Logistic and Manufacturing – Würth Italy Case Study"**", student **Riccardo Canal, Free University of Bozen-Bolzano (discussed December 2023).**", student Tessa Pulli, Free University of Bozen-Bolzano (discussed October 2022).
- Co-supervisor of Master Thesis "**Visual Analytics as Enabler for Human-Centred and Data- Driven Decision-Making in Logistic and Manufacturing – Würth Italy Case Study"**", student Riccardo Canal, Free University of Bozen-Bolzano (discussed December 2023).
- Co-supervisor of Master Thesis "**Development of a Digital Twin Concept for Sustainable Manufacturing in Ceramics Industry Based on Axiomatic Design"**", student Elahe Atarisharghi, Free University of Bozen-Bolzano (discussed December 2023).
- Co-supervisor of Master Thesis "**Role of simulation in a Digital Twin architecture for manufacturing applications"**", student Francesco Broggio, Free University of Bozen- Bolzano (discussed March 2024).
- Co-supervisor of Master Thesis "**Guidelines for the Design of Trustworthy and Ethically Sustainable AI Systems"**", student Silvia Di Salvatore, Free University of Bozen-Bolzano (ongoing, to be discussed in December 2024).
- Co-supervisor of Master Thesis "**Implementation of an IoT-enabled Energy Monitoring and Energy Flow Analysis**

for SMEs", student Fekadu Fucci, Free University of Bozen-Bolzano (ongoing, to be discussed in December 2024).

- Co-supervisor of Master Thesis "**Implementing state awareness and asynchronous task parallelization in Digital Twin Controlled-Cyber Physical Production Systems**", student Adrian Haupt, Free University of Bozen-Bolzano (ongoing, to be discussed in March 2025).

Bachelor Theses:

- Co-supervisor of Bachelor Thesis "**Development and Implementation of Industry 4.0 Mobile Training Unit in the Context of Learning Factories**", student Fabrizio Edoardo Vinante, Free University of Bozen-Bolzano (ongoing, to be discussed in December 2024).
- Co-supervisor of Bachelor Thesis "**Progettazione e prototipazione applicativo Joystick elettromeccanico multi-asse CAN-BUS**", student Edoardo Rossi, Free University of Bozen-Bolzano (ongoing, to be discussed in December 2024).

Master's Study projects:

- Co-supervisor of Study Project "**Implementing state awareness and asynchronous task parallelization in Digital Twin Controlled-Cyber Physical Production Systems**", studentes Alex Strickner and Adrian Haupt (discussed March 2024).

Areas of Scientific Interest

Smart Production and Cyber Physical Systems

- Industry 4.0 and Industry 5.0;
- Digital Twin applications in manufacturing;
- Remote control of CPPSs;
- Dynamic task allocation in CPPS.

The transition from Industry 4.0 (technological push) towards Industry 5.0 (human inclusion, sustainability) requires awareness in the utilization of technological solutions and approaches, to enhance efficacy and efficiency of manufacturing processes. Considering the dynamic and unpredictable nature of contemporary market demands and the unstable constraint affecting production flows, flexibility, adaptability, and reconfigurability become main features of modern industries. Digital Twin applications enable not only the

finest optimization of production systems, but also allow them to be dynamically controlled through virtualized architectures. Strongly networked and connected systems, on the other hand, are more complex to be managed and may expose greater cyber-attackable surface. These and other challenges, along with the development of the above mentioned technologies and approaches are core parts of my field of research.

Experience in Research projects	2020 – 2022	ICARUS - An Innovative Higher Education Institution Training Toolbox to Effectively Address the European Industry 4.0 Skills Gap and Mismatches Role: Research Fellow Research consortium with 4 partners University of Malta, Royal Institute of Technology (KTH), University of Minho, University Politehnica of Bucharest
	2021-2021	CAMP-2021 - Digital and Technology Summer Camp 2021 Role: Organization, Presenter. Project for technology transfer to schools in collaboration with Bitz Fablab.
	2022-2022	CAMP-2022 - Digital and Technology Summer Camp 2022 Role: Organization, Presenter. Project for technology transfer to schools in collaboration with Bitz Fablab.
	2020 – 2023	ETAT - Education & Training for Automation 4.0 in Thailand Role: Research Fellow Research consortium with 13 partners: Carinthia University of Applied Sciences, University of Antwerp, University of Porto, University of Oviedo, Slovak University of Technology in Bratislava, Rajamangala University of Technology Tawan-ok, Rajabhat Rajanagarindra University, King Mongkut's University of Technology North Bangkok, King Mongkut's Institute of Technology Ladkrabang, Kasetsart University, Edunet World

Association, Eastern Economic Corridor Office,
Burapha University

2023 – 2026 SME 5.0 – A Strategic Roadmap Towards the Next Level of Intelligent, Sustainable and Human-Centred SMEs

Roles: Call preparation,
Active Contributor

Duration: 01.01.2023 – 31.12.2026

Research consortium with 16 international partners: Free University of Bozen-Bolzano, Technical University of Kosice, Montanuniversität Leoben, University of Malta, Royal Institute of Technology, Technical University of Munich, Graz University of Technology, Worcester Polytechnic Institute, Chiang mai University, Purdue University Fort Wayne, Universidad del Salvador, University of Stellenbosch, Deakin University, Elcom s.r.o., Endian S.r.l., Komptech GmbH.

2023 – 2026 START – Sustainable Data Driven Manufacturing

Roles: Call Preparation,
Research Fellow,
Member of Management Board,
Member of Communication Team.

Research consortium with 5 partners: Gruppo Ceramiche Gresmalt S.p.A, SACMI Imola S.C., Free University of Bozen-Bolzano, Università degli Studi di Sassari, Università della Calabria

2021 – 2027 Ethiopia-Djibouti – Females at Makerspaces (Erasmus+)

Roles: Call Preparation,
Active technical development and supervision.

Research consortium with 9 partners: Heilbronn University of Applied Sciences, Carinthia University of Applied Sciences, Dire Dawa University, Arsi University, Samara University, Wollo University, Wollega University, Association of Women in Business, University of Djibouti.

- 2024 – / DigiTech4CRAFT (ERDF)**
 Roles: Call Preparation.
 (State: under revision)
 Research consortium with 3 partners: Eurac Research, LVH-APA, Free University of Bozen-Bolzano
- 2024 – / BOOST AI – AI as an Accelerator for HED Industry 5.0 and green Entrepreneurship for SMEs Early Adoption**
 Roles: Call Preparation.

National and International Collaborations

National Collaborations:

- Collaboration with Dr. Davide Settembre Blundo (Innovability Manager) and Dr. Marco Vacchi at **Gruppo Ceramiche Gresmalt S.p.a.** in the context of the START project.
- Collaboration with Raphael Vallazza (C.E.O.) and Marco Pomalo at **Endian S.r.l.** in the mutual exchange of knowledge about IT/OT cybersecurity, joint workshops, joint technological development, joint publication (accepted, to be presented in December 2024).
- Collaboration with Igor Falcomatà (C.E.O.) at Enforcer S.r.l., joint workshops, joint publication (accepted, to be presented in December 2024).
- Collaboration with Prof. Luca Pietrantoni and Dr. Federico Fraboni from **Università di Bologna** in studying the cognitive ergonomics in human-robot collaboration (joint publications).
- Collaboration with Ing. Filippo Cividini from **Smart Robots S.r.l.** Milan in research (joint publication) on artificial intelligence based perception in human-robot collaboration.
- Collaboration with Prof. Fiorenzo Franceschin and Dr. Riccardo Gervasi of the **Politecnico di Torino** (joint project proposal development)
- Collaboration with **Automotive Excellence Southtyrol** (organization of workshops and events).

- Collaboration with the **Chamber of Commerce of Bolzano** for the World Skills international competition event.
- Collaboration with Agenzia Piemonte Lavoro and FANUC Italia S.r.l. for the World Skills national competition event.

International Collaborations:

- Collaboration with Prof. Chang Tsun Li of the **Deakin University** of Melbourne, Australia, on the inclusion of cybersecurity in Digital Twin-oriented Cyber-Physical Production Systems.
- Collaboration with Prof. Emmanuel Francalanza and Amberlynn Bonello of the **University of Malta** on the further development of the Mobile Training Unit presented in the ICARUS project and the inclusion of the Digital Twin concept (joint publications).
- Collaboration with Prof Sven Seidenstricker (**Duale Hochschule Baden-Württemberg Mosbach**), Assoc. Prof. Manuel Ferdik and Dr. Anita Onay (**Management Center Innsbruck**), and Aitor Ruiz de la Torre Acha (**Universidad del País Vasco EHU/UPV**) for the development of a joint Erasmus+ proposal (and joint paper, accepted, to be presented in December 2024).
- Collaboration with Prajaks Jitngernmadan of the **Burapha University of Chon Buri**, Thailand, (joint paper with other 5 Thai universities in the context of the ETAT project).
- Collaboration with Giacomo Roman at **BMW AG**, Munich, Germany (joint publication).

**Research
Stays Abroad**

- 01-02/2024 Deakin University, Melbourne, Australia**
Visiting Researcher in the EU project SME 5.0.
Collaboration with Prof. Chang-Tsun Li in the field of Cybersecurity applied to Cyber-Physical Production Systems.
- 02-04/2024 University of Malta, Malta.**
Visiting Researcher in the EU project SME 5.0.
Collaboration with Prof. Emmanuel Francalanza

in the field of Digital Twin applications design and implementation for Cyber-Physical Production Systems

Participation in exhibition events

- Participation of the Smart Mini Factory Research Group at the “**TechParcour Handwerk 2021**” at NOI Tech Paark.
- Exhibitor at the **institutional inauguration of the NOI Techpark in Brunico** and of the *Sustainable Manufacturing Lab.* (2024)
- Exhibitor at the **Tipworld Fair 2024** (Brunico, Italy). Presentation of the *Mobile Training Unit* station for the transfer of knowledge concerning Digital Twin applications for Cyber-Physical Production Systems remote control and monitoring, Collaborative Robotics, industrial communication protocols, and IT/OT cybersecurity.

Invited Talks

- Invited speaker at the “**Small Enterprises take big steps towards Industry 5.0**” event of the Universidad del Salvador, Buenos Aires, Argentina, in the context of the SME5.0 international project. April 2024, (online)
- Invited speaker at the **Blended Intensive Programme (BIP)** on Digital Manufacturing, Vitoria, Spain, with a presentation on “Digital Twin Architectures and Techniques for Remote Control and Monitoring of Cyber-Physical Production Systems, March 2024.

Publications

Relevant publications in the field of this call:

- **De Marchi, M.**, Gualtieri L., Rojas R. A., Rauch E., Cividini F., Integration of an Artificial Intelligence Based 3D Perception Device into a Collaborative Human-Robot Workstation for Learning Factories (2021). Proceedings of the 11th Conference on Learning Factories (CLF) 2021.

- Rojas, R. A.; Mark, B.; **De Marchi, M.**; Rauch, E.; Matt D. T., Plug-and-Play and Reconfigurable Transport Network Architecture to Put into Practice Connectivity and Interoperability in Learning Factories (2021). Proceedings of the 11th Conference on Learning Factories (CLF) 2021.
- **De Marchi, M.**, Mark, B. G., Angeli, N., Rauch, E., Matt, D. T. (2022). Using RFID and Industrial IoT in Manual Assembly for Data Collection and Processing in Learning Factories. Available at SSRN 4074692.
- **De Marchi, M.**, Rojas, R., Aruväli, T., Rauch, E., & Matt, D. T. (2022). Digital Twin Architecture of a Cyber-physical Assembly Transfer System. In Proceedings of the 3rd International Conference on Innovative Intelligent Industrial Production and Logistics.
- Aruväli, T., **De Marchi, M.**, Rauch, E. (2023). Monitoring System Architecture for Long-Term Resilience in Manufacturing. *Modern Materials and Manufacturing (MMM2023), Tallinn, 2-4 May 2023*. AIP Publishing. (Proceedings not published yet).
- Aruväli, T., **De Marchi, M.**, Rauch, E., Matt, D. (2023). Design Decomposition for Cyber Resiliency in Cyber-Physical Production Systems. 15th International Conference on Axiomatic Design (ICAD2023).
- Nezzi, C., **De Marchi, M.**, Aruväli, T., Vidoni, R., Rauch, E. (2023). Implementation of 3D Simulation to Foster Digital Twin Based Applications in Manufacturing: An Educational Case Study. Proceedings: 13th Conference on Learning Factories 2023, Reutlingen, 9-11 May 2023. SSRN.
- **De Marchi, M.**, Mark, B. G., Aruväli, T., Rauch, E., Matt, D. T. (2023). IoT Based Monitoring in Learning Factories for Education in Smart and Sustainable Manufacturing. 20th International Conference on Remote Engineering and Virtual Instrumentation (REV2023).
- Nezzi, C., **De Marchi, M.**, Aruväli, T., Cochran, D.S., Rauch, E. (2023). Demonstrating the Potentials of Digital Twin in Manufacturing: An Axiomatic Design-Based Application for Engineering Education. In: Borgianni, Y., Matt, D.T., Molinaro, M., Orzes, G. (eds) Towards a Smart, Resilient

and Sustainable Industry. ISIEA 2023. Lecture Notes in Networks and Systems, vol 745. Springer, Cham.

- **De Marchi, M.**, Bonello, A., Francalanza, E., Rauch, E. (2023). A Digital Twin for SMEs in the context of Industry 5.0. 17th CIRP Conference on Intelligent Computation in Manufacturing Engineering. (Proceeding to be published yet)
- **De Marchi, M.**, Friedrich, F., Riedl, M., Zadek, H., & Rauch, E. (2023). Development of a Resilience Assessment Model for Manufacturing Enterprises. *Sustainability*, 15(24), 16947.
- **De Marchi, M.**, Oehler, M., Nezzi, C., Rauch, E., Matt, D.T. (2024). Computer Vision in a Digital Twin Based Manufacturing Process to enable Dynamic Visual Inspection in Learning Factories. *Proceedings of the 14th Conference on Learning Factories 2024*, Volume 1. (Presented, to be published in August 2024).
- Nezzi, C., **De Marchi, M.**, Vidoni, R., Rauch, E. (2024). Modeling and Simulation of Mechatronics Equipment for a Digital Twin-Enabled Demonstrator. In *2024 10th International Conference on Control, Decision and Information Technologies (CoDIT 2024)*. IEEE.
- Aruväli, T., **De Marchi, M.**, & Rauch, E. (2023). Analysis of quantitative metrics for assessing resilience of human-centered CPPS workstations. *Scientific Reports*, 13(1), 2914.
- Aruväli, T., **De Marchi, M.**, Rauch, E., & Matt, D. T. (2024). Cyber-Physical Production System Design Decomposition for Internal Disruption Avoidance. In *Design, Simulation, Manufacturing: The Innovation Exchange* (pp. 3-14). Cham: Springer Nature Switzerland
- **De Marchi, M.**, Pomalo, M., Vallazza, R., Falcomatà, I., Rauch, E., (2024). *Proceedings of the 6th International Conference on Industry 4.0 and Smart Manufacturing*. (submitted, to be presented in November 2024).
- **De Marchi, M.**, Rauch, E. Drivers, Enablers and Barriers to the Adoption of Digital Twins in Manufacturing Industry: a

Systematic Literature Review. Production and Manufacturing Research (Journal Article, under review).

- **De Marchi, M.**, Li, C.T., Rauch, E. Reference Architecture for Cyber Secure Industrial Digital Twin Applications. Journal of Intelligent Manufacturing (Journal Article, under review).

Other pertinent publications:

- Mark, B., Gualtieri, L., **De Marchi, M.**, Rauch, E., Matt, D. T., Function-Based Mapping of Industrial Assistance Systems to User Groups in Production (2020). CIRPe Global Conference - Flexible Mass Customization, Leuven, Belgium, 2020 (pp. 278-283).
- Gualtieri, L., Fraboni, F., **De Marchi, M.**, Rauch, E. (2021, June). Evaluation of Variables of Cognitive Ergonomics in Industrial Human-Robot Collaborative Assembly Systems. In Congress of the International Ergonomics Association (pp. 266-273). Springer, Cham.
- Rauch, E., Jitngernmadan P., Martin F. M., **De Marchi M.**, A Descriptive Analysis for Education and Training on Automation 4.0 in Thailand (2021). Proceedings of the 11th Annual International Conference on Industrial Engineering and Operations Management, Singapore, 2021 (pp. 1214-1224).
- Fraboni, F., Gualteri, L, **De Marchi. M.**, Rauch, E, Human-Robot Collaboration During Assembly Tasks: The Cognitive Effects of Collaborative Assembly Workstation Features (2021). In Congress of the International Ergonomics Association (pp. 242-249). Springer, Cham.
- Gualteri, L; Fraboni, F.; **De Marchi. M.**; Rauch, E.; Development and Evaluation of Design Guidelines for Cognitive Ergonomics in Human-Robot Collaborative Assembly Systems (2022). Applied Ergonomics, 104, 103807.
- Rauch, E.; Gualtieri, L.; Mark, B.; **De Marchi. M.**; Matt, D. T.; Digitalization of Practical Laboratory teaching in Learning Factories in the Age of Covid-19. European Professors of Industrial Engineering and Management, 36 (pp. 36-40);

- Fraboni, F., Gualtieri, L., **De Marchi, M.**, Puzzo, G., Pietrantonio, L., Rauch, E. (2022, April). An Experimental Study on Workstation Characteristics in Industrial Human-Robot Collaboration. Oral Presentation at the Human Factors and Ergonomics Society – Europe Chapter Annual Meeting 2022, Turin, Italy, 20th -22nd April, 2022;
- Panchetti, T., Fraboni, F., Gualtieri, L., **De Marchi, M.**, Pietrantonio L. (2022, April). An Eye Tracker Study on Cognitive Ergonomics in Human-Robot Collaboration. Poster Presentation at the Human Factors and Ergonomics Society – Europe Chapter Annual Meeting 2022, Turin, Italy, 20th -22nd April, 2022;
- Fraboni, F., Gualtieri, L., Panchetti, T. De Angelis, M., Puzzo, G., **De Marchi, M.**, Pietrantonio, L. Carico di Lavoro Cognitivo nella Collaborazione Uomo-Robot: in che Modo le Funzionalità di Progettazione della Workstation Possono Migliorare l'Esperienza dei Lavoratori? Presentazione orale al XII Congresso Nazionale della Società Italiana di Ergonomia e Fattori Umani – SIE2022, Lucca, 2-4 Maggio, 2022;
- **De Marchi, M.**, Jitngernmadan, P., Singsri, P., Putpuek, N., Kumpakeaw, S., Bundasak, S., ... & Rauch, E. (2022). Network Architecture of ETAT Education and Training Centers for Automation 4.0. In International Symposium on Industrial Engineering and Automation (pp. 330-338). Cham: Springer International Publishing.
- Mark, B. G., **De Marchi, M.**, Rauch, E., & Matt, D. T. (2022). Expert-based Classification of Worker Assistance Systems in Manufacturing Considering the Human. In Proceedings of the 3rd International Conference on Innovative Intelligent Industrial Production and Logistics.
- Horvath, M., **De Marchi, M.**, Rojas, R., Rauch, E., & Matt, D. T. (2022). Application of an Industry 4.0 Assessment Model: A Case Study Application in Material Supply for Assembly. In Proceedings of the 3rd International Conference on Innovative Intelligent Industrial Production and Logistics.

**Presentations
at
Conferences**

- **International Conference on Industrial Engineering and Operations Management (IEOM) 2021**, Singapore – presentation of 1 conference paper.
- **11th Conference on Learning Factories CLF 2021**, Graz, Austria – presentation of 2 conference papers.
- **12th Conference on Learning Factories CLF 2022**, Singapore, Singapore – presentation of 1 conference papers.
- **1st International Symposium on Industrial Engineering and Automation ISIEA 2022**, Bolzano, Italy – presentation of 1 conference paper.
- **3rd International Conference on Innovative Intelligent Industrial Production and Logistics IN4PL 2022**, Valletta, Malta – presentation of 2 conference papers.
- **14th Conference on Learning factories CLF 2024**, Enschede, Netherlands – presentation of 1 conference paper.

**Memberships
in
Associations,
Research
Groups, and
other Roles**

- **Associazione Italiana delle Tecnologie Manifatturiere (AlteM)** – Member of the Young Researchers Group (Gruppo Giovani).
- **International Association of Learning Factories (IALF)** – Member of the working group “AI for manufacturing systems/Artificial Intelligence in production processes”, responsible for the “Digital Twin” research stream.
- **WorldSkills Lyon 2024** – “Expert” and “Observer” for the Skill 48 - “Industry 4.0 – Manufacturing and Engineering Technology” (Italian Representative at world-level competition).
- **WorldSkills Piemonte 2024** – “Expert” and “Test Project Validator” for the Skill 63 - “Robotic Systems Integration” (Italian Representative at world-level competition).
- **Smart Mini Factory Laboratory** for Industry 4.0, Free University of Bozen-Bolzano – Active Research Member.

Editorial Activity

- **Guest Editor for Collection “Industry 5.0”** – Communications Engineering – build-up phase.
- **Topical Advisory Panel** member for Machines (MDPI), Q2.
- Member of the **Technical Committee** of the 7th International Conference on Management Science and Industrial Engineering (MSIE 2025)

Reviewer Activity

- Reviewer of the article “Driving Manufacturing Companies Towards Industry 5.0: A Strategic Framework for Process Technological Sustainability Assessment (P-TSA)” – Sustainability (MDPI).
- Reviewer of the article “Applications of Digital Twin in Human Factors, Ergonomics and Organisational Dynamics”, International Journal of Human Factors and Ergonomics (Inderscience).
- Reviewer of article “Identification of barriers to sustainable manufacturing implementation - manufacturers of parts and components for agricultural transport perspective”, Sustainability (MDPI).
- Reviewer of article “Enhancing Competitiveness: Driving and Facilitating Factors for Industry 4.0 Adoption in Thai Manufacturing”, Economies (MDPI).
- Reviewer of article “Thermoeconomics Meets Business Science: Systemic Exergy Management (SYMEX) as a New Theoretical Framework for Sustainability”, Global Journal of Flexible Systems Management.
- Reviewer of article “A multidimensional holistic sustainability model for production systems”, Journal of Production & Manufacturing Research.
- Reviewer of article “Organizational flexibility in the era of AI: Leveraging decision-making styles for market segmentation”, Global Journal of Flexible Systems Management.

**Organization
of Workshops
and
Conferences**

- **"Digital and Technology Summer Camp"**, Bolzano, organizer and presenter, July 2021.
- Co-organizer of the **1st International Symposium on Industrial Engineering and Automation (ISIEA 2022)**, June 2022.
- **"Digital and Technology Summer Camp"**, Bolzano, organizer and presenter, July 2022.
- **Blended Intensive Programme (BIP) on Digital Manufacturing**, Bolzano, co-responsible for group-works on Industrial Assistance Systems, April 2022.
- Series of Courses **"Industry 4.0 for High School Teachers"**, Bolzano, March 2023.
- **Blended Intensive Programme (BIP) on Digital Manufacturing**, Bolzano, responsible for industrial demonstrations at the Smart Mini factory laboratory, March 2023.
- Course **"Industry 4.0"** for the Chamber of Commerce of Bolzano, May 2023.
- Course **"Automation and Robotics"** for the Chamber of Commerce of Bolzano, June 2023.
- Co-designer, co-organization, and speaker at the **1st Workshop on IT/OT Cybersecurity**, held at the Smart Mini Factory laboratory of the Free University of Bozen-Bolzano, in cooperation with Automotive Excellence South Tyrol, Endian S.r.l., and Enforcer S.r.l., October 2023.
- Course **"Industry 4.0 for High School Teachers"**, Bolzano, November 2023.
- **Blended Intensive Programme (BIP) on Digital Manufacturing**, Vitoria, Spain, March 2024.
- Co-designer, co-organization, and speaker at the **2nd Workshop on IT/OT Cybersecurity**, held at the NOI Techpark Brunico, in cooperation with Automotive Excellence South Tyrol, Endian S.r.l., and Enforcer S.r.l., September 2024.

- Co-Chair of **4th International Symposium on Industrial Engineering and Automation (ISIEA 2025)**, June 2025.

Technology Transfer

In cooperation with the team of the Smart Mini Factory laboratory, projects aimed at transferring technological knowledge have been conducted:

- “Boulder Ball” project with the company **Climball OHG** to adopt computer vision to optimize the pick-and-place process of semi-finished components and enable a robot-based autonomous process.
- Collaboration with the company **Thermo Tecno Management (TTM) S.r.l.** for the introduction of collaborative robotics solutions to enhance efficiency and quality of specific production steps.

Third Mission

- **Co-Organization of 3 course modules** within the ESF/FSE funded Smart Enterprise Qualification Program to qualify professionals from local industry, October 2022 – March 2023.
- **Co-Organization of trainings and webinars on Industry 4.0 topics for professionals from industry** in the Smart Mini Factory lab (~200 participants).
- **Co-Organization of a trainings and webinars on Industry 4.0 topics for High School students and teachers** in the Smart Mini Factory lab (18 schools and 180 participants).
- **Yearly workshop at the Smart Mini Factory** lab for a group of high school students, initiative “Rendevouz mit dem Traumberuf”.

Institutional Activities

- Member of the study course council for the executive 1st level Master in **Digital Transformation e Smart Manufacturing**.
- Responsible for the research area “**Intelligent Production systems**” in the Smart Mini Factory laboratory for Industry 4.0

of the Free University of Bozen-Bolzano headed by Prof. Erwin Rauch.

Further data

Skills and competences:

- Advanced knowledge of Operating Systems, Word Processing and Data Sheet applications;
- Profound knowledge in implementing software applications using programming languages such as Python, JS, good abilities in C++, C# and VBA;
- Advanced knowledge in AI, with focus on Machine Learning and Artificial Neural Networks implementation for advanced data analytics and computer vision;
- Advanced experience and knowledge in frontend applications frameworks (React JS in Java Script);
- Moderate experience and knowledge in backend applications frameworks (Django in Python);
- Consistent knowledge about industrial communication protocols;
- Considerable practice in the adoption and utilization of data visualization and collection tools and IoT platforms (ThingsBoard, Grafana, EdgeX Foundry);
- Advanced knowledge in software deployment techniques (microservitization, Docker);
- Very good knowledge of software version management tools and software version management collaboration platforms (Git, GitHub);
- Core utilization of CI/CD tools (such as GitHub Actions)
- Good knowledge in microservices systematic orchestration (Kubernetes);
- Everyday use of project and knowledge management (Jira, Atlassian);
- Relevant skills in the design, development, implementation, and maintenance of IoT-based Cyber-Physical Production Systems;
- Advanced skills in the design, development, implementation, and maintenance of Digital Twin-oriented architectural design as well as Digital Twin-based applications in the field of industrial settings;
- Solid knowledge in IT/OT cybersecurity (technical and theoretical concepts, Endian Secure Platform);
- Highly familiar with the utilization of microcontrollers (Arduino), single board computers (Raspberry Pi), and electronic prototyping;

- Good knowledge in Axiomatic Design and the use of Acclaro DFSS software;
- Advanced capabilities in Additive Manufacturing processes (Fused Deposition Modelling in particular);
- Sound skills in Simulation Programs such as FlexSim and Siemens Plant Simulation;
- Advanced skills in robot programming and development of robotic solutions (Adept-Omron, ABB, Kuka, FANUC);
- Advanced skills in Collaborative Robots Programming (Universal Robots *cobots* in particular, FANUC);
- Good knowledge in worker assistance systems in production (physical, sensorial and cognitive aid systems);
- Good skills in digital modelling and visualization with VR/AR (Unity);
- Basic knowledge in Robotic Operating Systems (ROS).
- Substantial knowledge concerning the Blockchain technology and underlying concepts.

Relevant course attendance:

- Planning and Simulation of Production and Logistics Systems (February 2019 – June 2019, Master Degree).
- Industrial Automation and Mechatronics (February 2019 – June 2019, Master Degree).
- Logistics Strategies and Methods (October 2019 – January 2020, Master Degree).
- Advanced Statistics (November 2020 – February 2021, PhD course at UniBz).
- Advanced Scientific English (November 2020 – February 2021, PhD course at UniBz).
- Theory of Scientific Method (November 2020 – February 2021, PhD course at UniBz).
- Theory of Scientific Method (November 2020 – February 2021, PhD course at UniBz).
- Robotic Operating System (ROS) related courses (January 2021 – June 2021, offered online by the “The Construct”, <https://www.theconstructsim.com/>).
- Machine Learning (February 2021 – June 2021, Master course of the Faculty of Computer Science at UniBz)
- Industrial Collaborative Robotics (January 2023, optional course of the Faculty of Engineering of the Free university of Bozen-Bolzano.
- Summer School “Enabling Technologies for Industrial Internet of Things (ET-I2oT 2023)”, July 2023.

- “Corso di programmazione robotica FANUC” at FANUC Italia S.r.l., March 2024 (32h).

Language competence

Language	Certifying Body	Level
Italian	-	Native Language
English*	British Council, IELTS (05/2023)	C1 (8)
German**	Language Center UNIBZ (01/2017)	B2

Driving license

Italian “B” driving license

I declare, pursuant to art. 76 of Presidential Decree 445/2000, that the information is true. I authorize the processing of my personal data in accordance with Legislative Decree 30 June 2003, n. 196 "Code for the protection of personal data" and the GDPR 679/16 - "European Regulation on the protection of personal data".

Bolzano, 07/10/2024