Curriculum Vitae of ERWIN RAUCH

Personal information

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Education since leaving school

- 05/2019: **National Scientific Habilitation (ASN)** for Assoc. Prof. level in the scientific sector ING-IND/16 (Manufacturing Systems and Technologies).
- 04/2013: **PhD (Dr.-Ing.), Research Doctorate**, dissertation titled "Concept of a changeable and modular production system for franchising models", Supervisor: Univ.-Prof. Dr.-Ing. Dr.-Ing. E.h. Dr. h.c. Dieter Spath, University of Stuttgart, Germany, grade: "summa cum laude".
- 2004-2007: **Dipl.-Wirtsch.-Ing., Master in Business Administration** with specialization in Accounting-Auditing-Consulting and Logistics, TUM Business School, Munich, Germany.
- 2004-2006: **M.Sc., Master of Science in Mechanical Engineering** with specialization in Production Management, Technical University of Munich, Germany.
- 2001-2004: **B.Sc., Bachelor of Science in Production and Logistics**, Politecnico di Torino / Free University of Bolzano, Italy.
- 1996-2001: **perito industriale, Technical High-School degree** in Mechanical Engineering, Bolzano, Italy.

Present appointments

- **from 03/2023 to 02/2026 Endowed professor with fixed-term contract (professore straordinario) in "Sustainable Manufacturing" (Manufacturing Systems and Technologies SSD ING-IND/16)** co-financed by Automotive Excellence South Tyrol – Free University of Bolzano, Faculty of Engineering, Industrial Engineering and Automation (IEA).
- **10/2022 – 01/2023 Associate Professor of Manufacturing Systems and Technologies (SSD ING-IND/16)** – Free University of Bolzano, Faculty of Science and Technology, Industrial Engineering and Automation (IEA)
- **02/2014-09/2022 Assistant Professor of Manufacturing Systems and Technologies (SSD ING-IND/16)** – Free University of Bolzano, Faculty of Science and Technology, Industrial Engineering and Automation (IEA)
- **Since 2023 Head of "Sustainable Manufacturing Lab"** at the external campus of the Faculty of Engineering at NOI Techpark Brunico
- **Since 2014 Head of "Smart Mini Factory" laboratory for Industry 4.0** at the Faculty of Science and Technology –

https://smartminifactory.it/

- **2016-2022 Second Member (Vice-Director) of the study course council for the Master in Industrial Mechanical Engineering (LM-33)**, coordination of the international Double Degree program with Otto v. Guericke University of Magdeburg (Germany)
- **Member of the Ph.D. Collegium** in "Sustainable Energy and Technologies" (2014/15 – 2018/19) and "Advanced Systems Engineering" (since 2019/20), Faculty of Science and Technology, unibz.
- **Advisory Board Member** Fraunhofer Italia Research – Automation and Mechatronics Engineering (AME) research group.
- **Scientific Committee Member** of the International Association of Learning Factories (IALF)
- **Executive Committee Member and Publication Committee Chair** of the International Association of Axiomatic Design (IAAD)
- **Member of the Steering Board** and coordinator of research projects of EPIEM (European Professors of Industrial and Engineering Management)
- **Editor in Chief** of the Journal (Q1 Scopus) Production & Manufacturing Research (Taylor & Francis)

Professional experience

- October 2020 – today: **Instructor in online courses for C-level executives and vice presidents – Smart-Manufacturing-Network, a brand of Manufacturing Leaders Ltd.**, masterclasses on Industry 4.0 Technology & Data: Digital Manufacturing in the Factory of the Future.
- 2019 – **Appointment offer at KTH Royal Institute of Technology (Sweden)** (#89 in QS World University Rankings) as first ranked out of >40 candidates **for the position of Associate Professor** in the department "Sustainable Production Development". Declined.
- September 2018 – today: **Contract Professor** – **Management Center Innsbruck (Austria)**, lecturer in the in the course "Production Engineering and Operations III" and "Systems Engineering" (in English), Master in Industrial Engineering.
- February 2017 – February 2018: **Contract Professor** – **International School of Management (Germany)**, lecturer in the course "International Operational Management" (in English), Master in International Management, Campus Munich (Germany).
- February 2013 – February 2014: **Contract Professor - Free University of Bolzano (Italy)**, lecturer in the course "Production Planning and Control", Bachelor in Industrial and Mechanical Engineering.
- February 2012 – February 2017: **Associate Partner at Matt & Partner Management Consulting** in Bolzano (Italy).
- February 2007 – February 2012: **Consultant at Matt & Partner Management Consulting** in Bolzano (Italy) - Project management in international consulting projects (manufacturing systems planning, factory planning, lean and operations management, logistics and supply chain management, production planning and control).
- 2009 - 2011: **Research Assistant** in the research project "Design of lean and agile material handling systems in make-to-order production", Free University of Bolzano (Italy).

- 2007 – 2013: **Teaching Assistant** in several courses at the Faculty of Science and Technology, Free University of Bolzano (Italy).
- 2006 – 2007: **Business Analyst at ifp Consulting** in Munich (Germany), Institute for Production and Logistics, Prof. Dr.-Ing. Joachim Milberg – Technical Management Consulting for Bosch and ZF Sachs.

Experience in academic teaching

Main courses at Free University of Bolzano

- Lecturer in **AI Applications in Industry**, Free University of Bolzano, Master in Industrial Mechanical Engineering, 5 ECTS, Language: English.
- Lecturer in **Digital Manufacturing and Simulation**, Free University of Bolzano, Master in Industrial Mechanical Engineering, 5 ECTS, Language: English.
- Lecturer in **Digital Production Planning and Quality Assurance**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 8 ECTS, Language: German.
- Lecturer in **Production Systems and Industrial Logistics**, Free University of Bolzano, Bachelor in Industrial Mechanical Engineering, 10 ECTS, Exercises and laboratory, Language: German.

Courses as Contract Professor

- Since 2022 Contract Professor in **Systems Engineering**, Management Center Innsbruck (MCI) (Austria), Master in Industrial Engineering, 5 ECTS, Language: English.
- 2018-2022 Contract Professor in **Production Engineering and Operations III**, Management Center Innsbruck (MCI) (Austria), Master in Industrial Engineering, 2,5 ECTS, Language: English.

Other courses/seminars in academic year 2022/23:

- Lecturer at the **EUCLIDES International Week:** Production management, simulation of manufacturing plants, 13-17 March, 2023, at Universidad del Pais Vasco, Spain (https://www.ehu.eus/es/web/vitoria-gasteizko-ingeniaritza-eskola/speakers). Good practices and successful cases, English.

Other courses/seminars in academic year 2021/22:

- Guest lecturer for **Industry 4.0 and Smart Manufacturing**, Purdue University Fort Wayne (IN, USA), Master level, 2 hours online guest lecture in the course Systems Engineering of Prof. David Cochran, Language: English.
- Organiser and lecturer of the **Online Summer School "Systems Engineering and Design of Complex Systems"**, Free University of Bolzano, graduate 2 ECTS, 4 hours lecture, in collaboration with Massachusetts Institute of Technology (MA, USA), Purdue University (IN, USA), Worcester Polytechnic Institute (MA, USA), Reykjavik University (Iceland), Universidade Nova de Lisboa (Portugal), Utrecht University (Netherlands), Polytechnique Montréal (Canada) and Università degli Studi Guglielmo Marconi (Italy). Language: English.
- Lecturer at the **EUCLIDES International Week:** Digital Manufacturing – Technologies and Management, 14-18 March, 2022, at Free University of Bolzano (https://www.unibz.it/it/events/139102-international-week-bip).

Other courses/seminars in academic year 2020/21:

- Lecturer in the course **Digital Transformation Expert**, organized by UMIT the private university of Tirol, executive course, 14 hours guest lecture in Industry 4.0 and digital process innovation, Language: German.
- Guest lecturer for **Industry 4.0 in Supply Chains and Organizations**, Worcester Polytechnic Institute (MA, USA), Master in Supply Chain Management, 2 hours online guest lecture in the course Supply Chain Management of Prof. Joseph Sarkis, Language: English.
- Guest lecturer for **Digital Business Transformation**, Financial University Moscow under the Government of the Russian Federation, Management and Innovation, 8 hours online guest lecture, Language: English.
- Lecturer in the **Summer School "Design of Complex Systems and Artificial Intelligence in Design"**, Free University of Bolzano, graduate 2 ECTS, 4 hours lecture, in collaboration with Visiting Professor Sang Gook Kim from Massachusetts Institute of Technology (MA, USA) and Prof. David Cochran from Purdue University (IN, USA), Language: English.
- Lecturer at the **EUCLIDES International Week Industry 4.0:** Technologies and Management, 8-12 March, 2021, at Free University of Bolzano (https://industry40week.events.unibz.it/).

Other courses/seminars in academic year 2019/20:

- Guest Lecturer in the **TU Austria Summer School Doc+**, Summer School of Doctoral Students from Austrian Technical Universities, September 21-25 2020, 8 hours lecture in Axiomatic Design, Language: English.
- Lecturer in the **Tutorial for Axiomatic Design**, 4th Annual Meeting 2020 SME 4.0 – Industry 4.0 for SMEs, Kosice (Slovakia), February 18 2020, 4 hours lecture, Language: English.

Other courses/seminars in academic year 2018/19:

- Lecturer in the **1st International Summer School in Axiomatic Design – Design of Complex Systems in Industry 4.0**, Worcester Polytechnic Institute (MA, USA) with live connections to universities in Italy (unibz), Austria, Colombia, Australia and Mexico, e-learning format (video-recording with Echo360 and video-conference using Zoom) with 60 students, July 23-25 2019, 20 hours lecture, Language: English.
- Guest lecturer for **Industry 4.0 in Supply Chains and Organizations**, Worcester Polytechnic Institute (MA, USA), Master in Supply Chain Management, 4 hours lecture in the course Supply Chain Management of Prof. Joseph Sarkis, Language: English.
- Guest lecturer for **Industry 4.0 in Production and Logistics**, Chiang Mai University (Thailand), Master in Industrial Engineering, 4 hours lecture, Language: English.
- Lecturer in the **Tutorial for Axiomatic Design**, 3rd Annual Meeting 2019 SME 4.0 – Industry 4.0 for SMEs, Chiang Mai University (Thailand), January 29 2019, 4 hours lecture, Language: English.

Other courses/seminars in academic year 2017/18:

- Contract professor in **International Operations Management**, International School of Management Campus Munich (Germany), Master in International Management, 2 ECTS, 18 hours lecture, Language: English.
- Lecturer in the **Summer School for Axiomatic Design**, Free

University of Bolzano, graduate 2 ECTS, 10 hours lecture, in collaboration with Visiting Professor Chris Brown from Worcester Polytechnic Institute (MA, USA), Language: English.

Other courses/seminars in academic year 2012/13:

- Contract Professor in **Production Planning and Control**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 96 hours of lecture and exercises, Language: German.
- Teaching Assistant in **Production Systems and Industrial Logistics**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering; 10 ECTS, 90 hours of exercise and laboratory, Language: German.
- Teaching Assistant in **Innovation Oriented Business Management in Industrial Companies**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 60 hours of exercise and laboratory, Language: German.

Other courses/seminars in academic year 2011/12:

- Teaching Assistant in **Production Systems and Industrial Logistics**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 120 hours of exercise and laboratory, Language: German.
- Teaching Assistant in **Innovation Oriented Business Management in Industrial Companies**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 60 hours of exercise and laboratory, Language: German.

Other courses/seminars in academic year 2010/11:

- Teaching Assistant in **Production Systems and Industrial Logistics**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 120 hours of exercise and laboratory, Language: German.
- Teaching Assistant in **Innovation Oriented Business Management in Industrial Companies**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 60 hours of exercise and laboratory, Language: German.
- Teaching Assistant in **Technology Management**, Free University of Bolzano, Executive Master in Innovation Engineering, 5 ECTS, 50 hours of exercise and laboratory, Language: German.
- Teaching Assistant in **Production Systems**, Free University of Bolzano, Executive Master in Innovation Engineering 5 ECTS, 50 hours of exercise and laboratory, Language: German.

Other courses/seminars in academic year 2009/10:

- Teaching Assistant in **Innovation and Project Management**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 5 ECTS, 40 hours of exercise and laboratory, Language: German.
- Teaching Assistant in **Production Systems**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 100 hours of exercise and laboratory, Language: German.
- Teaching Assistant in **Transport and Logistics**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 80 hours of exercise and laboratory, Language: German.

Other courses/seminars in academic year 2008/09:

- Teaching Assistant in **Innovation and Project Management**, Free

University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 5 ECTS, 50 hours of exercise and laboratory, Language: German.

- Teaching Assistant in **Production Systems**, Free University of Bolzano, Bachelor in Industrial and Mechanical Engineering, 10 ECTS, 100 hours of exercise and laboratory, Language: German.

Innovative teaching formats/methods

- Organization of **3 International Online Summer Schools in Axiomatic Design** in 2018/19 (before pandemic), 2020/21 and in 2021/22 with live connections to universities in Italy, Austria, Colombia, Australia, Iceland, Netherlands, Canada, Portugal, and Mexico, e-learning format (using Zoom and Teams) with more than 100 students, phd-students, researchers and professionals from industry; 2 ECTS, 20 hours lecture, Language: English.
- **Introduction of modern software for practising digital company business processes in course exercises** (e.g. ERP system Microsoft Dynamics NAV in collaboration with EOS Solutions GmbH of Bolzano; Visual Shop Floor in collaboration with Solunio GmbH in Brunico; MES/APS in collaboration with Etagis GmbH; MiniTab software for statistical process control, Tecnomatix Process Simulate in collaboration with Siemens; FlexSim simulation software; Thingsboard industrial IoT platform)
- **Use of collaboration/interaction tools and methods** (e.g. Mentimeter, Miro Collaborative Whiteboard, Break-out session)
- **Change from lecture style towards dialog style:** Based on my experience as Visiting Scholar in United States (3 months in 2019) I changed my style of lecturing by including more space for discussion sessions and encouraging students to switch from "note takers" to "critical thinkers".
- **Virtual and remote lab experience:** in the course Simulation in Production and Logistics for graduate students they learn how to develop a digital model of a factory and the manufacturing/logistics processes and get the possibility to virtually "walk through" by the use of Virtual Reality devices.
- **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.
- **Industry challenge in the course Production Systems and Industrial Logistics:** Together with the course responsible Prof. Dominik Matt, part of the exercise hours (24 hours) have been dedicated since 2020/21 to a new format of practice oriented teaching by involving industrial companies. In the so called "Industry Challenge" an industrial company provides a problem related to manufacturing to be solved. Students are visiting the company and receive relevant data. Then they work in groups on recommendations and present finally their solutions to the management board. In 2020/21 the students developed solutions for a more sustainable packaging material and process.

- **Development of a mobile training unit for Industry 4.0** in the Erasmus+ project ICARUS for conducting trainings and teaching also decentralized at high schools or companies.
- **Introduction of the learning factory teaching concept in unibz** (following the trend for practice-oriented education and training) through lectures and exercises in the Smart Mini Factory. After running through an audit process, the Smart Mini Factory is since 1st July 2021 a certified member of the International Association for Learning Factories (IALF). The Smart Mini Factory is one of 31 worldwide best-practice examples recognized in the book "Learning Factories – Concepts, Guidelines, Best-Practice Examples" https://www.springer.com/gp/book/9783319922607.
- **Achievement of a Best Track Award (IEOM 2017) and an Outstanding Paper Award (IEEE IEEM 2018)** out of 350 works for innovative teaching methods in engineering education.
- **Transfer of the learning factory teaching concept** (e.g. Panel Speaker to several international conferences like IEOM and Interreg SCET-NET, regular presentation of advancements at the yearly CIRP sponsored International Conference on Learning Factories as well as Track Chair of Engineering Education 4.0 at ISM 2021 and ISM 2022).
- **Knowledge transfer to universities of developing countries:** support of the Chiang Mai University to establish an Industry 4.0 learning factory at the Faculty of Industrial Engineering. The Mini Learning Factory Center has been inaugurated in 2021.
- **Lifelong Learning offer:** In the Smart Mini Factory I developed in 2018 first pilots of lifelong learning seminars and in 2019 a professional booklet for lifelong learning seminars (professionals from industry as well as teachers from high schools) and student seminars. After a "pause" during the pandemic the seminar offer has been revised in 2021 with the re-opening of the lab for the public. Link to the booklet: https://smartminifactory.it/wp-content/uploads/2021/04/SMF-booklet-2021.pdf.
- **Introduction of the 2-week "Digital Technology Summer Camp"** for high school students for orientation (July 2021 and July 2022) funded by European Social Fund.

Supervision of students

- **Supervision and co-supervision of more than 100 Bachelor/Master thesis and study projects** at Free University of Bolzano, Otto v. Guericke University Magdeburg, University of Malta, MCI Management Center Innsbruck and G. Marconi University Rome.
- **Second supervisor of PhD-candidate Chiara Nezzi**, Free University of Bolzano: "Digital Twin Based Kinematic and Mechatronic Modelling for Optimizing Performance and Energy Efficiency of Machines", 2022-2026.
- **Main supervisor of PhD-candidate Matteo De Marchi**, Free University of Bolzano: "Reference Architecture for Digital Twins in Cyber-Physical Production Systems", 2020-2024.
- **Main supervisor of PhD-candidate Benedikt G. Mark**, Free University of Bolzano: "Classification and Selection Method for the Identification of Appropriate Worker Assistance Systems", 2019-2022.
- **Main supervisor of PhD-candidate Luca Gualtieri,** Free University of Bolzano: "Methodologies for the Design of Safe and Ergonomic Collaborative Robotic Assembly Systems in Industrial Settings", 2018-

2021.

- **Support of Visiting PhD-student Hendrik Stern**, University of Bremen (Germany): "Integration of Human Factors in the Design of Cyber-Physical Production Systems" (supervisor Prof. Till Becker, University of Bremen).
- **Support of Visiting PhD-student Andrew Vickery**, Worcester Polytechnic Institute (WPI): "Framework for Introducing Digital and Smart Data Analytics in SMEs in the Context of Industry 4.0" (supervisor Prof. Chris Brown, WPI). Joint journal publication.
- **Support of Visiting PhD-student Adirek Baisukhan**, Chiang Mai University (Thailand): "Advanced Manufacturing and Additive Manufacturing for SMEs" (supervisor Prof. Wasawat Nakkiew, CMU). Joint journal publication.
- **Support of Visiting PhD-student Sunida Tiwong**, Chiang Mai University (Thailand): "Development of a Framework for Logistics Service Provider Lifecycle" (supervisor Prof. Sakgasem Ramingwong). Joint conference paper.
- **PhD Examination Committee Member of Jenifer Vasquez**, Pontificia Universidad Javeriana (Colombia) / Politecnico di Torino (Italy): "Development of a Comprehensive Sustainability Model for Environmental and Productive Process Improvement in Small and Medium-Sized Enterprises (SMEs)" (Prof. Hugo Santiago Aguirre and Prof. Luca Settineri), thesis defence in 2021.
- **PhD Examination Committee Member of Christina Schmidbauer**, Technical University Vienna (Austria): "Adaptive Task Sharing between Humans and Cobots in Assembly" (Prof. Sebastian Schlund), thesis defence in 2022.
- **PhD Examination Committee Member of Yotsaphat Kittichotsatsawat**, Chiang Mai University (Thailand): "Development of a Supply Chain Model in Food Industry" (main supervisor Prof. Korrakot Tippayawong). Thesis defence in 2023.
- **PhD Examination Committee Member of Elisa Prati**, Università degli Studi di Modena e Reggio Emiglia: "Development of methods and tools to design human-centred systems 4.0" (supervisor: Prof. Margherita Perruzzini, Prof. Marcello Pellicciari), thesis defence in 2023.
- **PhD Examination Committee Member of Federico Biasutti,** University of Udine (Italy): "Nuovi paradigmi gestionali e tecnologie di fabbricazione per imprese competitive a basso impatto ambientale" (Prof. Marco Sortino), thesis defence in 2023.

Areas of scientific interest

Sustainability in Manufacturing

- Circular Economy in manufacturing
- Resource and Energy Efficiency in manufacturing
- Decarbonization and eco-intelligent factories
- Social sustainability, integration of the human and ethics
- (Human) value sensitive design of socio-technical systems

Sustainable production systems are defined by economic sustainability (competitiveness through process efficiency), ecological sustainability (energy-efficient production) and social sustainability (human-centred or anthropocentric production systems and models). Distributed manufacturing concepts like micro-factories or mobile factories are promising concepts for

increasing ecological sustainability in the value and supply chain. A specific focus in this research lies in the integration of the human in smart factories addressing aspects of social sustainability as well as ethics. Based on a human-value sensitive design approach also ethical aspects of introducing emerging technologies like trustworthy and explainable AI are addressed. In addition the combination of mechanical/technical systems with digital and biological systems plays an increasing role. This leads in the future to bio-intelligent manufacturing systems within the Biological Transformation in manufacturing.

Experience in research projects

International/European Grants:

2023 – 2026 **EDU-CIRC - Cross-border network for education and training in the circular economy and decarbonization in production**
Role: PI
Duration: start date to be defined, already aquired
Funding Body: Interreg Italy-Austria
Budget unibz: € 368.424,00 (total budget € 930.120,00)
Research consortium with partners from Austria.

2023 – 2027 **EE4M – Engineering Excellence for Mobility Value Chain**
Role: Partner and PI unibz
Duration: 01.01.2023 – 31.12.2026
Funding Body: Erasmus+ KA 2-3 (Centre of Vocational Excellence CoVEs)
Budget unibz: € 514.199,00 (total budget € 3.535.985,00)
Research consortium with 14 international partners.

2023 – 2026 **SME 5.0 – A Strategic Roadmap Towards the Next Level of Intelligent, Sustainable and Human-Centred SMEs**
Role: Co-I unibz and Project Manager
Duration: 01.01.2023 – 31.12.2026
Funding Body: HORIZON-MSCA-2021-SE-01
Budget unibz: € € 248.400,00 (total budget € 1.168.400,00)
Research consortium with 16 international partners.

2022 – 2025 **SESTO SENSO - Physical Cognition for Intelligent Control and Safe Human-Robot Interaction**
Role: Co-Investigator for unibz
Duration: 01.09.2022 – 31.08.2025
Funding Body: Horizon Europe (RIA)
Budget unibz: € 300.000,00 (total budget € 5.619.026,00)
Consortium with other 13 European academic and industrial partners: Università degli Studi di Genova, University of Oxford, Centro Ricerche Fiat, Idiap Research Institute, University of Zaragoza, University of Ljubljana, University of Latvia, The Centre for Research and Technology Hellas, University of Bologna, Ocado innovation, INERTIA Technology, RISE Research Institutes of Sweden, Institut Franco-Allemand de Recherches de Saint Louis

2022 – 2024 **SMF4INFRA - Smart Mobile Factory for Infrastructure Projects**
Role: team member
Duration: 01.01.2022 – 31.12.2024
Funding Body: Autonomous Province Bolzano - Joint Projects Switzerland (SNF)
Budget unibz: € 266.403,00 (total budget € 934.572,00)
Joint project with ETH Zürich and Eurotube Hyperloop research organization.

2020 – 2023 **ETAT - Education & Training for Automation 4.0 in Thailand**
Role: PI unibz
Duration: 15.01.2020 – 14.01.2023
Funding Body: Erasmus+ KA 2-3
Budget unibz: € 63.966,00 (total budget € 997.757,00)
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

2019 – 2022 **ICARUS - An Innovative Higher Education Institution Training Toolbox to EffeCtively AddRess the EUropean InduStry 4.0 Skills Gap and Mismatches**
Role: PI unibz
Duration: 01.09.2019 – 28.02.2022
Funding Body: Erasmus+ KA 2-3
Budget unibz: € 62.000,00 (total budget € 325.000,00)
Research consortium with 4 partners University of Malta, Royal Institute of Technology (KTH), University of Minho, University Politehnica of Bucharest

2017 – 2021 **SME 4.0 – Industry 4.0 for SMEs**
Role: Co-I unibz and Project Manager (PI Prof. Dominik Matt)
Duration: 01.01.2017 – 31.12.2021
Funding Body: H2020 MSCA RISE 2016
Budget unibz: € 311.500,00 (total budget € 783.000,00)
Research consortium with 8 partners: Montanuniversität Leoben - Austria, Technical University Kosice - Slovakia, Elcom sro – Slovakia, Massachusetts Institute of Technology – USA, Worcester Polytechnic Institute – USA, Chiang Mai University - Thailand, SACS MAVMM – India).
First EU H2020 project of unibz as project coordinator.

2019 – 2020 **WIRECOBOTS - Wire harness assembly using**

collaborative robots to increase efficiency and ergonomics
Role: team member (PI Prof. Renato Vidoni)
Duration: 15.04.2019 – 14.12.2020
Funding Body: ESMERA – EU Cascade funding
Budget unibz: € 100.000,00 (total budget € 200.000,00)
Research project and pilot implementation with the company Carretta srl.

2019 – 2020 **CoHoMe - Comparison and Homogenization Of Safety Measurements**
Role: team member (PI Prof. Renato Vidoni)
Duration: 15.06.2019 – 14.03.2020
Funding Body: COVR – EU Cascade funding
Budget unibz: € 20.000,00 (total budget € 100.000,00)
Research project with Joanneum Research and Technical University Graz.

2018 – 2021 **E-EDU 4.0 - Engineering Education 4.0**
Role: Co-I (PI Prof. Dominik Matt)
Duration: 01.05.2018 – 30.04.2021
Funding Body: European Regional Development Fund (ERDF) - Interreg Italy-Austria
Budget unibz: € 180.000,00 (total budget € 1.150.000,00)
Research consortium with 5 partners: Carinthia University of Applied Sciences – Austria, HTL Höhere Technische Bundeslehranstalt Wolfsberg – Austria, Friuli Innovazione Centro di ricerca e di trasferimento tecnologico – Italy, t2i– trasferimento tecnologico e innovazione – Italy, Camera di Commercio di Treviso e Belluno – Italy.

2018 – 2019 **A21 - A21DIGITAL TYROL VENETO**
Role: team member (PI Prof. Dominik Matt)
Duration: 01.03.2018 - 31.12.2019
Funding Body: European Regional Development Fund (ERDF) - Interreg Italy-Austria
Budget unibz: € 155.000,00 (total budget € 300.000,00)
Research consortium with A21-Austria and University of Verona.

National/Regional Grants (10 projects):

2023-2026 **START – Sustainable Data-Driven Manufacturing**
Role: PI unibz
Duration: 01.07.2023 – 30.06.2026
Funding Body: MISE - Ministero dello Sviluppo Economico
Budget unibz: € 551.875,00 (total budget € 6.873.292,69)
Research consortium with Gresmalt spa, Sacmi spa, Università di Sassari and Università della Calabria.

2023-2025 **SFDD – Sustainable Factory Design Decomposition**
Role: PI
Duration: 01.02.2023 – 31.01.2025
Funding Body: Autonomous Province of Bolzano – Mobility

Fund
Budget unibz: € 154.600,00
Research proposal for funding a 2-year position of a senior researcher, project in collaboration with Purdue University.

2022-2023 **ASSIST4RESILIENCE – Increasing Resilience in Manufacturing - Development of a Digital Twin Based Worker Assistance**
Role: PI
Duration: 01.01.2022 – 31.12.2023
Funding Body: Autonomous Province of Bolzano – Mobility
Budget unibz: € 169.500,00
Research proposal for funding a 2-year position of a senior researcher

2022-2023 **SEQP – Smart Enterprise Qualification Program**
Role: PI
Duration: 01.02.2022 – 31.03.2023
Funding Body: European Social Fund (ESF)
Budget unibz: € 56.729,00
Interdisciplinary proposal for a qualification program for professionals from industry (Faculty of Science and Technology and Faculty of Computer Science)

2020-2022 **SUSTAINABLE SMEs 4.0 – Development of a Methodology for the Long-Term Sustainable Introduction of Industry 4.0 in SMEs**
Role: PI
Duration: 26.04.2020 – 24.10.2022
Funding Body: Autonomous Province of Bolzano – mobility fund
Budget unibz: € 28.625,00
Research project with Prof. David Cochran, Purdue University, USA.

2021-2022 **CAMP-2022 - Digital and Technology Summer Camp 2022**
Role: PI
Duration: 14.10.2021 – 31.08.2022
Funding Body: European Social Funding (ESF)
Budget unibz: € 35.716,80
Project for technology transfer to schools in collaboration with Bitz Fablab.

2021-2021 **CAMP-2021 - Digital and Technology Summer Camp 2021**
Role: PI
Duration: 17.06.2021 – 31.07.2021
Funding Body: European Social Funding (ESF)
Budget unibz: € 35.825,00
Project for technology transfer to schools in collaboration with Bitz Fablab.

2021-2021 **PCK – Women in Construction**
Role: PI
Duration: 01.01.2021 – 30.10.2021
Funding Body: European Social Funding (ESF)
Budget unibz: € 1.600,00
Project for qualifying women in construction in advanced technologies.

2020-2021 **BUILD UP – Costruiamo il Futuro**
Role: PI
Duration: 01.09.2020 – 30.04.2021
Funding Body: European Social Funding (ESF)
Budget unibz: € 1.600,00
Project for qualifying non-EU foreigners who fall under the definition of vulnerable.

2017 – 2020 **COCKPIT - Collaborative Construction Process Management**
Role: Team member
Duration: 01.01.2017 – 31.12.2020
Funding Body: ERDF (EFRE/FESR) call 2015
Budget unibz: € 503.200,00
Interdisciplinary project with the Faculty of Computer Science and Fraunhofer Italia.

Internal unibz Grants (10 projects):

2020-2022 **SMART APP- Automated Process Planning in Cyber Physical Production Systems of Smart Factories**
Role: PI
Duration: 01.10.2020 – 30.09.2022
Funding Body: UNIBZ ID 2020 call
Budget unibz: € 130.400,00
Interdisciplinary project proposal with the Faculty of Computer Science

2020-2023 **MASTERMIL - Mastering the digital transformation in the family business: Getting ready for the Millennial generation**
Role: team member (PI Prof. Alfredo De Massis)
Duration: 01.09.2020 – 31.08.2023
Funding Body: UNIBZ ID 2020 call
Budget unibz: € 173.000,00
Interdisciplinary project proposal with the Faculty of Economics and Management

2019-2022 **ASSIST4WORK - Social sustainability in production through age-appropriate and disability-friendly workplace design using assistance systems**
Role: Co-I (PI Prof. Dominik Matt)
Duration: 15.01.2019 – 14.07.2022
Funding Body: UNIBZ CRC 2018 call
Budget unibz: € 98.000,00
Project in collaboration with the social enterprise gwb

Bolzano and Fraunhofer Italia.

2017-2021 **EYE TRACK - Industrial Usability of Eye Tracking for Manufacturing and Design in SMEs**
Role: PI (changed to Co-I from 01.03.2019)
Duration: 01.11.2017 – 31.01.2021
Funding Body: UNIBZ CRC 2017 call
Budget unibz: € 63.000,00
Project in collaboration with Technische Fachoberschule Max Valier Bozen, University of Modena and Reggio Emilia, Fraunhofer Italia Research, Landesverband der Handwerker, Barbieri electronics, Planit srl.

2017-2020 **SMART SHOPFLOOR - Development of a software prototype for intelligent Shop Floor Management through Industry 4.0 technologies**
Role: Co-I (PI Prof. Dominik Matt)
Duration: 01.01.2017 – 31.12.2020
Funding Body: UNIBZ CRC 2016 call
Budget unibz: € 70.000,00
Project in collaboration with Innovaalp and Anytime srl.

2015-2016 **DIMASY – Design of decentralized and distributed manufacturing systems and their coordination in manufacturing networks**
Role: PI
Duration: 01.01.2015 – 31.12.2016
Funding Body: UNIBZ CRC 2014 call
Budget unibz: € 34.500,00
Project in collaboration with Fraunhofer Italia Research and Tecnomag GmbH.

2015-2017 **REBU - Business Model Reconfiguration and Innovation**
Role: Co-I
Duration: 01.01.2015 – 31.03.2017
Funding Body: UNIBZ CRC call 2014
Budget unibz: € 39.050,00.
Project with industrial partners Fraunhofer Italia – Italy, University of Udine – Italy, Frener & Reifer GmbH – Italy.

2014-2017 **Future-LPD - Experts survey to assess the transfer of lean methods from production to product development**
Role: PI
Duration: 01.12.2014 – 31.01.2017
Funding Body: UNIBZ RTD call
Budget unibz: € 4.300,00.

2013-2016 **FISSMEs - Field study to determine requirements for flexible and agile manufacturing and assembly systems for SMEs**

Role: team member (PI Dr. Pasquale Russo Spena)
Duration: 01.11.2013 – 30.04.2016
Funding Body: UNIBZ CRC call 2013
Budget unibz: € 32.000,00.

2008-2011 **Design of lean and agile material handling systems**
Role: team member (PI Prof. Dominik Matt)
Duration: 20.11.2008 – 30.11.2011
Funding Body: UNIBZ CRC call
Budget unibz: € 21.000,00.

Commissioned Research / Industry projects (14 projects):

2023-2025 **PMA - Digital Twin based kinematic and mechatronic modelling for testing and optimizing the performance and energy efficiency of machines**
Role: PI
Duration: 01.01.2023 – 31.12.2025
Funding Body: LG-14
Budget unibz: € 54.000,00
Progress Group AG and Machineering GmbH

2022-2023 **AES – Feasibility Study for Live and Digital Carbon Footprint Tracking**
Role: PI
Duration: 01.11.2022 – 31.10.2023
Funding Body: LG-14
Budget unibz: € 27.000,00
Innovation Cluster Automotive Excellence South Tyrol.

2022-2022 **NOI – Implementation of a pilot application of a Sustainability Assessment**
Role: PI
Duration: 01.11.2022 – 31.12.2022
Funding Body: NOI Techpark South Tyrol
Budget unibz: € 7.200,00

2022-2022 **GW - Evaluation and proposal of robotic solutions for resistivity measurement and optimized layout scenarios**
Role: Co-I
Duration: 01.07.2022 – 31.08.2022
Funding Body: LG-14
Budget unibz: € 8.000,00
Global Wafer Co. MEMC Electronic Materials S.p.A.

2021-2022 **TTM-1 - Adaptive Production Planning and Flexible Automation**
Role: Co-I (PI – Prof. Renato Vidoni)
Duration: 16.11.2021 – 31.08.2022
Funding Body: LG-14
Budget unibz: € 38.000,00
TTM - Thermo Tecno Management GmbH – Prad am Stilfser Joch

2021-2022 **SAT – Development of a Sustainability Assessment Tool**
Role: PI
Duration: 15.11.2021 – 31.03.2022
Funding Body: EEN – European Enterprise Network
Budget unibz: € 11.500,00
NOI Techpark AG, Forschungsförderungsgesellschaft Österreich FFG, Standortagentur Tirol, Oberösterreichische Wirtschaftsagentur, Steirische Wirtschaftsförderungsgesellschaft

2021-2021 **DIGIFAP – Digital factory planning and optimization for electric mobility component manufacturing**
Role: Co-I (PI Dr. Patrick Dallasega)
Duration: 18.08.2021 – 31.10.2021
Funding Body: NOI-Lab Bonus
Budget unibz: € 11.100,00
Intercable - Bruneck

2021-2021 **DMI-1 – Industry 4.0 Assessment**
Role: PI
Duration: 01.06.2021 – 31.07.2021
Funding Body: NOI-Lab Bonus
Budget unibz: € 6.000,00
Doppelmayr Italia – Lana

2021-2021 **DURST-1 – Automation concept for the production of a special nozzle**
Role: PI
Duration: 01.02.2021 – 30.06.2021
Funding Body: LG-14
Budget unibz: € 55.000,00
Durst Phototechnik – Brixen

2020-2021 **SH-1 – Material flow simulation for warehouse automation**
Role: PI
Duration: 01.12.2020 – 21.04.2021
Funding Body: LG-14
Budget unibz: € 7.200,00
Sarner Holz – Sarnthein

2020-2021 **ALPITRONIC-1 – Analysis of the Potential for Using Industry 4.0 Worker Assistance Systems in the Charging Station Assembly**
Role: PI
Duration: 15.09.2020 – 28.02.2021
Funding Body: LG-14
Budget unibz: € 20.000,00
Alpitronic - Bozen

2021-2021 **SIM-EH-BZ II – Simulation Study of the Emergency**

Department in the Hospital of Bolzano
Role: PI
Duration: 30.07.2021 – 29.09.2021
Funding Body: /
Budget unibz: € 5.000,00
Südtiroler Sanitätsbetrieb (SABES), Azienda Sanitaria dell'Alto Adige (ASDAA)

2019-2019 **SIM-EH-BZ – Simulation Study of the Emergency Department in the Hospital of Bolzano**
Role: Co-I (PI Prof. Dominik Matt)
Duration: 01.07.2019 – 24.11.2019
Funding Body: /
Budget unibz: € 20.000,00
Südtiroler Sanitätsbetrieb (SABES), Azienda Sanitaria dell'Alto Adige (ASDAA)

2018-2019 **PROSTAHL – Collaborative robotics for the production of individual stainless steel furniture**
Role: PI
Duration: 01.12.2018 – 31.05.2019
Funding Body: LG-14
Budget unibz: € 12.000,00
Prostahl GmbH - Kaltern

National and International collaboration

National collaborations:

- Collaboration with **Fraunhofer Italia** Innovation Engineering Center IEC (Italy) in the field of research/publications and teaching in different projects/proposals (e.g. E-EDU 4.0, Assist4Work).
- Collaboration with Prof. Franco Fraccaroli and Maria Paola Paladino, Department of Psychology and Cognitive Science, **University of Trento** to prepare a research proposal for investigating psychological ergonomics in collaborative workspaces.
- Collaboration with Prof. Federico Brunetti from the **University of Verona** in the research project A21 Digital for developing the digitalization strategy of Veneto-SouthTyrol-NorthTyrol.
- Collaboration with Prof. Margherita Peruzzini from **Università degli Studi di Modena e Reggio Emilia** in the research project EyeTrack.
- Collaboration with Prof. Luca Pietrantoni and Dr. Federico Fraboni from **Università di Bologna** and Dr. Fabio Pini from **Università degli Studi di Modena e Reggio Emilia** in studying the cognitive ergonomics in human-robot collaboration (joint publications and research proposals).
- Collaboration with Prof. Rinaldo Rinaldi from the **University of Firenze** and Guido Cincinelli from **Leanprove A&C srl** in preparing a joint publication on collaboration stream mapping.
- Collaboration with Prof. Fiora Pirri from the **Sapienza University of Rome** in research (joint publication) on action forecasting in collaborative robotics.
- Collaboration with Prof. Carlo Gorla from **Politecnico di Milano**, Prof.ssa Francesca Maria Curà del **Politecnico di Torino** and Prof.ssa Giovanna Fargione dell'**Università degli Studi di Catania** in research preparing a research proposal on the characterization and

industrialization of gear components through additive manufacturing technologies.

- Collaboration with Prof. Gabriele Arcidiacono from **G. Marconi University in Rome** in research on Axiomatic Design and healthcare system optimization (special issue and publications).
- Collaboration with Dr. Giulia Bruno from **Politecnico di Torino** in research on agile scheduling and simulation (joint publication).
- Collaboration with Dr. Taavi Vaimel and Ing. Carlos Paz Rocha from **Intercable srl** in research (joint publication) on the development of a vision based assistance system in assembly.
- Collaboration with Ing. Filippo Cividini from **Smart Robots srl Milan** in research (joint publication) on artificial intelligence based perception in human-robot collaboration.
- Collaboration with Ing. Andrea Ghedin from **Carretta srl** in research (joint publication) on the development of a human-robot collaboration work cell.
- Collaboration with Dr. Davide Settembre Blundo from **Gresmalt spa** in research (START – MISE) on the development of a digital twin for smart and sustainable manufacturing in ceramic industry.

European collaborations:

- Collaboration with Prof. Helmut Zsifkovits, Dr. Manuel Woschank from **Montan University Leoben** in research (several publications) and preparing an Erasmus+ proposal.
- Collaboration with Prof. Michael Hofbaur from **Joanneum Research Robotics** in Klagenfurt in research on collaborative robotics (project CoHoMe).
- Collaboration with Vice-Dean Prof. Bern Zunk from **Technical University Graz** in the field of research (2 joint project proposals for EU projects).
- Collaboration with Prof. Gerhard Hilmer from **MCI Innsbruck** in teaching (contract lecturing on smart manufacturing)
- Collaboration with Prof. Fadi Donal from **UMIT Lienz** in teaching Industry 4.0 topics in an executive course for professionals in industry.
- Collaboration with Prof. Iva Kovacic from **Technical University of Vienna** preparing a research proposal for a FWF joint project.
- Collaboration with Prof. Sebastian Schlund from of **Fraunhofer Austria** preparing a research proposal for a FWF joint project.
- Collaboration with Dr. Fazel Ansari from **Technical University Vienna** in the IALF research working group on AI in manufacturing and preparing a joint article.
- Collaboration with Prof. Johannes Fottner and Dr. Dana Clauer from **Technical University Munich (fml)** in research on system design for autonomous guided vehicles in logistics (joint publications).
- Collaboration with Prof. Michael Friedrich Zäh, Dr. Susanne Vernim and Harald Bauer from **Technical University Munich (iwb)** in research (joint publication) and in the preparation of project proposals for a EU Horizon Europe RIA, VW Foundation and Joint DFG proposal.
- Collaboration with Prof. Christoph Lütge and Dr. Marjanne Thejls Ziegler from **Technical University of Munich (Institute for Ethics in Artificial Intelligence)** in research (joint publication) and the preparation of a EU project proposal.
- Collaboration with Prof. Mathias Hartmann and Prof. Wolfgang Dorner

from **Deggendorf Institute of Technology** in the preparation of a DFG joint project on AI and digital twins.

- Collaboration with Prof. Burkhard Corves from **RWTH Aachen** in the preparation of a DFG joint project on redundancy in hybrid mobile robotics for smart factories.
- Collaboration with Prof. Peter Plapper from **University of Luxembourg** in the preparation of a FNR joint project proposal and in the research working group for HRC of IALF.
- Collaboration with Prof. Hartmut Zadek of the **Otto von Guericke University of Magdeburg** in teaching (Double Degree program of LM33) and research (H2020 proposal).
- Collaboration with Prof. Michael Freitag and Prof. Till Becker from **BIBA Bremer Institut für Produktion und Logistik GmbH and University of Bremen** in research on human factors in cyber-physical systems (Visiting PhD student Hendrik Stern).
- Collaboration with Professor Sven Seidenstricker from **Baden-Wuerttemberg Cooperative State University Moosbach (Germany)** and MSc. Robert Hammerl of the **University of Stuttgart (Germany)** in research.
- Collaboration with Prof. Daniel Hall from **ETH Zürich** in Switzerland in research (project SMF4INFRA – joint project) and the research institute **Eurotube Hyperloop**.
- Collaboration with Prof. Vladimir Modrak, Prof. Jan Pitel, Prof. Alexander Hošovský and Dr. Slavomir Bednar from **Technical University of Kosice** in research (project SME 4.0 and joint publications) and the preparation of several research proposals.
- Collaboration with the **Carinthia University of Applied Sciences, University of Antwerp, University of Porto, University of Oviedo, Slovak University of Technology Bratislava, EDUNET World Association** and **7 Thai Universities** in the Erasmus+ project ETAT.
- Collaboration with Prof. Vitalii Ivanov from **Sumy State University Ukraine** in the organization of DSMIE conference (co-editing the conference proceeding book).
- Collaboration with Prof. Katerina Adam from **National Technical University of Athens (NTUA)** in research (joint publication) and in preparing an Erasmus project proposal.
- Collaboration with Prof. Felipe M. Martin from **Universidad de Oviedo** in Spain in research (joint publication) on automation 4.0.
- Collaboration with Prof. Arkady Trachuk from **University under the Government of the Russian Federation** for a guest lecture on Digital Business Transformation and Industry 4.0.
- Collaboration with Prof. Christian Linder from **ESCP Europe Business School London** in research on human-centred manufacturing and Industry 4.0 in supply chain management (joint publications).
- Collaboration with Prof. Stevan Stankovski from **University Politehnica of Novi Sad** in Serbia, Prof. Cristian Mustata from **University Politehnica of Bucharest** in Romania, Prof. Carina Pimentel from **Universidade de Aveiro** in Portugal and Prof. Anabela Alves from **University of Minho** in Portugal in research (joint publication) on competence development through simulation.
- Collaboration with Dr. Sarah Hofmayr from **National University of Ireland Galway** in research on inclusive manufacturing and worker

assistance systems (joint publication).

- Collaboration with Prof. Kerstin Johansen from **Jönköping University** in Sweden in research (special issue and panel discussion at IEOM 2022)
- Collaboration with Prof. Monica Bellgran and Dr. Seyoum Eshetu Birkie from **KTH Royal Institute of Technology –** Sustainable Production department in Sweden for setting up an Erasmus agreement as well as in research (special issue on smart, sustainable and resilient manufacturing).
- Collaboration with Prof. Emmanuel Francalanza and Prof. Jonathan Borg from **University of Malta** in research (joint publication, project ICARUS).
- Collaboration with Prof. Antonio Maffei from **KTH Royal Institute of Technology – Campus Stockholm,** Prof. Goran Putnik from **University of Minho** and Prof. Catalin Amza from **University Politehnica of Bucharest** in research and teaching (Erasmus+ project ICARUS, joint publications, joint research proposals).
- Collaboration with Dr. Tanel Aruväli from **Tallin University of Technology** in Estland in research (joint publication) on resilience in manufacturing through worker assistance systems.
- Collaboration with Dr. Helena Hashemi Farzaneh from TUM and **General Electric (GE) Additive Munich** in research (joint publication) on biological transformation in manufacturing.
- Collaboration with Dr. Marco Prüglmeier from **BMW AG Munich** in research (joint publication) on axiomatic design for autonomous mobile robots.

<u>International collaborations:</u>

- Collaboration with Prof. Nam P. Suh and Prof. Sang G. Kim from **Massachusetts Institute of Technologies (MIT)** in USA in research (book projects, special issue) and in teaching (summer schools and tutorials of Axiomatic Design).
- Collaboration with Prof. Chris Brown from **Worcester Polytechnic Institute (WPI)** in USA in research (several joint publications) and teaching (summer schools and tutorials) of Axiomatic Design.
- Collaboration with Prof. Joseph Sarkis from **Foisie Business School** in USA in research (joint book project on Industry 4.0 and Supply Chain Management)
- Collaboration with Prof. David Cochran from the Excellence Center in Systems Engineering at **Purdue University, USA** in research on sustainable manufacturing for SMEs (project Sustainable SMEs 4.0, guest lecture, joint publications).
- Collaboration with Prof. Carlos Antonio Meisel from **Universidad de Ibagué, Colombia** in the coordination and organization of the 1st International Summer School on Axiomatic Design for Industry 4.0.
- Collaboration with Prof. Korrakot Tippayawong and Prof. Wasawat Nakkiew from **Chiang Mai University** in Thailand in research (project SME 4.0, joint publications), for researcher exchange (hosting several visiting students) and for supporting to set up a learning factory lab at CMU.
- Collaboration with Prof. Prajaks Jitngernmadan from **Burapha University** in Thailand in research (joint publication) on automation 4.0.

- Collaboration with Dr. Nirut Naksuk from the **National Metal and Materials Technology Center (MTEC) at Bangkok Science Park** in researcher exchange.
- Collaboration with Dr. Steven Umbrello from **Institute for Ethics and Emerging Technologies, Boston, USA** in research (joint publication) and to prepare research proposals for investigating ethical aspects of Industry 4.0.
- Collaboration with Prof. Chiang Tsun-Li from from **Deakin University in Australia,** for preparing an EU MSCA research proposal, based on his experience on cybersecurity.
- Collaboration with **17 international experts from academia, industry and government** leading the focus group on AI in Manufacturing for the World Manufacturing Forum 2021.

Research stays abroad

- 06/2019-09/2019 **Visiting Research Scholar** in the EU project SME 4.0 – **Worcester Polytechnic Institute (WPI)**, Worcester Massachusetts (USA). Collaboration with Prof. Chris Brown and Prof. Joseph Sarkis (WPI) as well as Prof. Sang Gook Kim of Massachusetts Institute of Technology (MIT).
- 06/2018 and 06/2019 **Visiting Research Scholar** in the EU project SME 4.0 – **ELCOM sro**, Presov, Slovakia. Collaboration with Prof. Vladimir Modrak and Prof. Jan Pitel from Technical University of Kosice in case study research with the company Elcom.
- 11/2017-02/2018 **Visiting Research Scholar** in the EU project SME 4.0 at **Chiang Mai University and Bangkok Science Park** (Thailand). Collaboration with Prof. Korrakot Tippayawong, Prof. Wasawat Nakkiew and Dr. Nirut Naksuk from National Science and Technology Development Agency in Bangkok.
- 09/2017-11/2017 **Visiting Research Scholar** in the EU project SME 4.0 – **Worcester Polytechnic Institute (WPI)**, Worcester Massachusetts (USA). Collaboration with Prof. Chris Brown and Prof. Joseph Sarkis (WPI) as well as Prof. Sang Gook Kim of Masschussetts Institute of Technology (MIT).

Participation in exhibition events

- Participation of the Smart Mini Factory at the **NOI Day 2022** with an exhibition and demonstration of worker assistance systems, October 20 2022.
- Participation of the Smart Mini Factory at the "**TechParcour Handwerk 2021" at NOI** with an exhibition and demonstration of Augmented Reality and assistance systems, August 30 2021.
- Coordination of the participation of the Smart Mini Factory at the "**TechParcour Handwerk 2020" at NOI** with an exhibition and demonstration of collaborative robotics, Augmented Reality and assistance systems, July 24 2020.
- Participation of the Smart Mini Factory at the "**EOS Digital Enterprise Day" at Castel Maretsch** with a demonstration of collaborative robotics and a talk on Industry 4.0, October, 17-18 2019.
- Coordination of the participation of the Smart Mini Factory at the "**TechParcour Handwerk 2019" at NOI** with an exhibition and demonstration of collaborative robotics, Augmented Reality and assistance systems, July 26 2019.
- Participation at the "**LUNA - Long night of the research 2019**" with

an exhibition and demonstration in the Smart Mini Factory laboratory titled "Smart Factory".

- Coordination of the participation of the Smart Mini Factory at the "**SPC IPC Drives Parma 2018 – Cultura 4.0" at the fair of Parma** with a stand of the Smart Mini Factory lab, May 22-24 2018.
- Coordination of the participation of the Smart Mini Factory at "**Handwerk 2030" at NOI** with an exhibition and demonstration of Industry 4.0 technologies, July 13 2018.
- Participation at the "**LUNA - Long night of the research 2016**" with an exhibition and demonstration in the Smart Mini Factory laboratory titled "Hybrid assembly and human-robot collaboration".
- Participation at the "**Research Day 2015**" at the Free University of Bolzano (October 2015) on the topic: "Industry 4.0 - the intelligent and smart factory" - exhibition of actual research activities.
- Participation at the "**LUNA - Long night of the research 2014**" with an exhibition and demonstration in the "mini-factory"-laboratory titled "Simulation and optimization of manual assembly processes in the mini-factory!".
- Participation at the "**LUNA - Long night of the research 2012**" with an exhibition and demonstration in the "mini-factory"-laboratory titled "How to increase productivity in the variant-driven production".
- Participation at the "**LUNA - Long night of the research 2010**" with an exhibition and demonstration titled "From a product idea to a finished product – Planning, simulation and realization of industrial production processes". Demonstration of material-flow simulation case studies with FlexSim Simulation software.

Key Note/Panel speeches

- **Key Note speaker at INMOTION Tech Festival 2023**, presentation with the title "Road to the Future of Sustainable Manufacturing", May 2023, Brunico, Italy
- **Key Note speaker at MMM 2023** – Key note presentation with the title "Twin Transition towards Smart and Sustainable Manufacturing – Double challenge or double chance?", Conference on Modern Materials and Manufacturing, May 2-4, 2023, Tallinn, Estonia.
- **Key Note speaker at RSS 2023** – Key note presentation with the title "Unlock the Potential of Twin Transition Towards Smart AND Sustainable Manufacturing", Hong Kong Polytechnic University, RSS 2023, February 17, 2023, Hong Kong.
- **Panel Chair and speaker at IEOM 2022** – Panel chair and speaker in the panel session on "Transition to Human-Centric and Resilient Manufacturing", July 27, 2022, Rome, Italy.
- **Panel Chair and speaker at IEOM 2022** – Panel chair and speaker in the panel session on "Transition to Human-Centric and Resilient Manufacturing", July 27, 2022, Rome, Italy.
- **Panel speaker at the event Cusanus.Dialog – Climate Neutral Europe: How Industry is Meeting the Challenge** – panel discussion presenting first results of a sustainability assessment for industry, May 19, 2022.
- **Panel speaker at the event Trend Dialog in the project Talentregion Dolomit Live** – panel discussion on the future of industrial production, January 18, 2022.
- **Panel speaker at the World Manufacturing Forum 2021** – presentation of the White Paper on "AI as an enabler for long-term

resilience in manufacturing", October 20, 2021, Cernobbio, Italy.

- **Panel Chair and speaker at IEOM 2021** – panel chair and speaker in the session on Industry 4.0, August 4, 2021, online, Rome, Italy.
- **Panel speaker at ISPIM Innovation Conference 2021** – panel speaker in the session on Industry 5.0 – The Next Frontier, June 21, 2021, online, Berlin, Germany.
- **Panel speaker at EU Tech Chamber Advanced Manufacturing Council** – panel speaker in the session on Importance of Big Data in Advanced Manufacturing, April 9, 2021.
- **Panel-Speaker at the 11th International Conference on Industrial Engineering and Operations Management (IEOM 2021)** – panel speaker in the session on Global Engineering Education with a talk and panel-discussion about learning factories for teaching Industry 4.0, March 9, 2021, online, Singapore.
- **Key Note Speaker at TED´s 2020** – Key note presentation with the title "The second phase of Industry 4.0: the role of artificial and biological intelligence in manufacturing", Conference on Technology & Entrepreneurship in Digital Society, November 10, 2020, Moscow, Russia.
- **Panel Speaker at ESOF EuroScience Open Forum 2020** – panel presentation at largest interdisciplinary meeting on science and innovation in Europe in Trieste titled "Transfer of Industry 4.0 to Small and Medium Sized Enterprises", September 2-6, 2020, Trieste, Italy.
- **Key Note Speaker at DSMIE 2020** – Key note presentation with the title "Industry 4.0+: A look at the next level of intelligent and self-optimizing factories", 3rd International Conference on Design, Simulation, Manufacturing (DSMIE-2020), June 9-12, 2020, Kharkiv, Ukraine.

Invited talks

- **Invited Speaker at Handelskammer**, presentation with the title „ Nachhaltigkeit ist nicht nur Umweltschutz – Vorteil von nachhaltigem Wirtschaften für KMUs", October 19, 2023, Bolzano, Italy.
- **Invited Speaker at NOI Day 2022**, presentation with the title „ From the Smart Mini Factory to the Digital Twin in Production – the case Alpitronic", October 20, 2022, Bolzano, Italy.
- **Invited Speaker at NOI Unlock the Potential,** presentation with the title „Smart Mini Factory for local industry – the case Doppelmayr", September 29, 2022, Lana, Italy.
- **Invited Speaker at Digital Day 2022 organized by the Chamber of Commerce of Bolzano,** presentation with the title „Digitization as an enabler for sustainable management", September 21, 2022, Bolzano, Italy.
- **Invited Speaker at the Global Experts Meet on Mechanical Engineering and Mechatronics 2022 (GEMMEM22)**, presentation with the title „AI as Enabler for a More Sustainable and Resilient Manufacturing", July 29, 2022, Amsterdam, Netherlands.
- **Invited Speaker at IPEC 2022 (International Production Environmental Community)**, presentation with the title „AI as an enabler for long term resilience and sustainability in manufacturing", March 8, 2022, Nürnberg, Germany. Organized by IHK Nürnberg and Institute for Sustainability.
- **Invited Speaker at the Annual Meeting of the Italian Association of Ceramics 2021**, presentation with the title „ Dual

Transformation - the digital and sustainable transformation in manufacturing", December 10, 2021, online, Italy.

- **Invited Speaker at SCET-NET event - Senza Confini Education and Training Network**, presentation with the title "Digital technologies and university skills", April 22, 2021.
- **Invited Speaker at Webinar - New skills and professionalism to support the digitalization process of SMEs** organized by the Chamber of Commerce Treviso- Belluno, presentation with the title "Evolution of the processes of digitalization of SMEs", April 20, 2021.
- **Invited Speaker at Online Event - DIGITAL COMPETENCIES: How the roles and approaches of trainers and teachers are changing** organized by t2i - trasferimento tecnologico e innovazione, presentation with the title "Engineering Education Training Activities at unibz", March 29, 2021.
- **Invited Speaker at the Annual Meeting of the Italian Association of Ceramics 2020**, presentation with the title „Industry 4.0+ - the next challenge for industry", September 14, 2020, online, Italy.
- **Invited Speaker at "Der Mensch steht wieder im Mittelpunkt" - 10 Years of Fraunhofer Italia**, presentation with the title „Socially Sustainable Production", January 16, 2020, NOI Techpark Bolzano, Italy.
- **Invited Speaker at Cluster Event of the European Commission**, presentation with the title "Chances of Artificial Intelligence and Machine Learning for SMEs", December 10 2019, Brussel, Belgium.
- **Invited Speaker and Workshop Leader "Collaborative Robotics and Workplaces" - Digital Talent Day 2019**, Chamber of Commerce Bolzano, December 9 2019.
- **Invited Speaker at Workshop on Industry 4.0**, October 25 2019, presentation with the title "Industry 4.0 nella produzione e logistica" organised by Confindustria Macerata.
- **Invited Speaker at seminar on the integration of people with disabilities into the labour market,** Municipality of Bolzano, October 4 2019, title "Worker Assistance Systems for a better integration of disabled people in industrial companies".
- **Invited Speaker PhD Seminar Worcester Polytechnic Institute, Foisie Business School,** September 4 2019, Title "With Industry 4.0 towards the Smart and Digital Factory of the Future.
- **Speaker Executive Management Board meeting Chiang Mai University, Faculty of Engineering (Thailand)**, December 10 2018, Title "Industry 4.0 - Challenges and opportunities to rethink on higher education".
- **Speaker and moderator to the 1st Digital Laboratory of Confindustria Marche (Italy)**, October 18 2018, presentation with the title "Industry 4.0 for production and logistics" and moderation of round table discussion, organised by Confindustria Marche and Federmanager.
- **Speaker at MCI Management Center Innsbruck (Austria), WING-Kaminabend** May 11 2018. Presentation with the title "Innovative Aspects in Production Planning & Management".
- **Speaker at the Digital Day (Italy),** May 11 2018, round table discussion on Digitalization and Industry 4.0, organised by the Chamber of Commerce of Bolzano.

- **Speaker in a Workshop at Wirtschaftskammer Lienz (Austria),** January 25 2018, discussion on future Engineering Education, organised by Innos.
- **Speaker at the Student Award Ceremony at WPI (USA)**, November 13 2017, speech and Question-Answer-session on "Industry 4.0 – the new industrial revolution in Europe", organised by the SME (Society of Manufacturing Engineers) chapter in Worcester, MA.
- **Speaker at the round table of CV Forum 2017** (Italy), July 7 2017, congress of the Triveneto Accountants. Round table discussion on the topic of "Industry 4.0 and the profession of Accountants", moderated by Il Sole24ore journalist Katy Mandurino.
- **Speaker at the University of Malta (Malta)**, June 2 2017, seminar on Digital Factories for Innovative Product Development. Title "Industry 4.0 and Digitalisation -a challenge for SMEs".
- **Speaker at MCI Management Center Innsbruck (Austria), WING-Kaminabend** September 25 2015. Title "From Lean Management to Smart Factory - The role of the engineer in the era of Industry 4.0, CPS and IoT.
- **Speaker at the Research Day 2015** at Bozen-Bolzano with the following presentation "Industry 4.0 - the intelligent and smart factory".
- **Speaker at the "Start-up Aperitifs" (Italy)**, May 28 2013 organised by the Chamber of Commerce of Bolzano. Title "Growing as an entrepreneur - Today's challenges".
- **Speaker invited to the round table (Italy)** on the topic "Ethics in business? And exists!" Published in "forum-schule-heute", No. 2, 2013.
- **Speaker "Treffpunkt Wirtschaft 2012" (Italy)**, 6 July 2012 organised by the Chamber of Commerce of Bolzano. Title "Companies in change - growth in organisation and processes".

Presentation at conferences

- **3rd International Conference on Innovative Intelligent Industrial Production and Logistics IN4PL 2022,** Valletta, Malta – presentation of 1 conference paper
- **International Conference on Design, Simulation, Manufacturing DSMIE 2022** Poznan, Poland – presentation of 1 conference paper
- **International Conference on Industry 4.0 and Smart Manufacturing (ISM) 2021**, Linz, Austria – presentation of 1 conference paper.
- **European International Conference on Industrial Engineering and Operations Management (IEOM) 2021**, Rom, Italy – presentation of 1 conference paper
- **International Conference on Industrial Engineering and Operations Management (IEOM) 2021**, Singapore,– presentation of 1 conference paper
- **International Conference on Flexible Automation and Intelligent Manufacturing 2021**, Athen, Greece – presentation of 1 conference paper
- **14th EPIEM Conference 2021,** Graz, Austria – presentation of 2 conference papers
- **International Conference on Design, Simulation, Manufacturing DSMIE 2021** Kharkiv, Ukraine – presentation of 1 conference paper

- **International Conference CIRPe 2020** Leuven, Belgium - presentation of 2 conference papers
- **International Conference on Axiomatic Design (ICAD) 2019** Sydney, Australia - presentation of 3 conference papers
- **CIRP Learning Factories 2019** Braunschweig, Germany - presentation of 1 conference paper
- **IEEE International Conference on Industrial Engineering and Engineering Management (IEEM) 2018** Bangkok, Thailand – presentation of 3 conference papers
- **International Conference on Axiomatic Design (ICAD) 2018** Reykjavik, Iceland - presentation of 2 conference papers
- **CIRP Learning Factories 2017** Darmstadt, Germany – presentation of 1 paper
- **CIRP Design 2016** Stockholm, Sweden – presentation of 1 paper
- **CIRPe Web Conference 2015** Cranfield, UK – presentation of 1 conference paper
- **CIRP Conference on Life Cycle Engineering (LCE) 2015** Sydney, Australia – presentation of 2 conference papers
- **International Conference on Production Research (ICPR) 2014** Cluj-Napoca, Romania – presentation of 2 conference papers
- **CIRP Conference on Manufacturing Systems (CMS) 2014** Windsor, Canada – presentation of 2 conference papers
- **Conference on Changeable, Agile, Reconfigurable and Virtual Production (CARV)** Munich, Germany – presentation of 2 conference papers
- **AITEM 2013** Ancona, Italy - presentation of 1 conference paper
- **CIRP Conference on Intelligent Computation in Manufacturing Engineering (ICME) 2012** Naples, Italy - presentation of 2 conference papers
- **International Conference on Sheet Metal (SHEMET) 2011** Leuven, Belgium – presentation of 1 conference paper
- **International Multi-Conference on Engineering and Technological Innovation (IMETI) 2010** Orlando, FL, USA – presentation of 1 conference paper
- **CIRP Conference on Intelligent Computation in Manufacturing Engineering (ICME) 2010** Naples, Italy – presentation of 2 conference papers
- **Conference on Changeable, Agile, Reconfigurable and Virtual Production (CARV) 2009** Munich, Germany – presentation of 2 conference papers

Awards in Research

- **Stanford List of 2% Top Scientists** – listed under the 0.5% top scientists worldwide in the field of Industrial Engineering.
- **Outstanding Paper Award**, International Symposium on Industrial Engineering (ISIEA 2022).
- **Top 100 Industry 4.0 Thought Leader** in the 2021 Onalytica Who's Who report on Industry 4.0 (https://onalytica.com/wp-content/uploads/2021/06/Whos-Who-In-Industry-4.0.pdf).
- **Nomination as expert for the World Manufacturing Foundation (WMF) Report 2020** on the topic "Manufacturing in the Age of Artificial Intelligence.
- **Outstanding Professor in Industry 4.0 Award 2021 –** 4th European Industrial Engineering and Operations Management

Conference (IEOM 2021). Rome, Italy, August 2-5, 2021

- **ADRF Park's Prize 2019-20** endowed with 1,500 USD and sponsored by the Axiomatic Design Research Foundation (ADRF).
- **South Tyrolean Research Award 2019** endowed with 40,000 Euro of funding for research on "Potentials of Biological Transformation in Manufacturing", awarded on December 19, 2019 in Bolzano, Italy (NOI TechPark).
- **Best Student Paper Award** for the paper "Smart Data Analytics in SME Manufacturing – an Axiomatic Design based Conceptual Framework", ICAD 2019, 13th International Conference on Axiomatic Design. Sydney, Australia, October 18-20, 2019.
- **Best Track Paper Award (Track Industry 4.0)** for the paper "Suitability of Industry 4.0 Concepts for Small and Medium Sized Enterprises: Comparison between an Expert Survey and a User Survey", IEOM 2019 9th International Conference on Industrial Engineering and Operations Management. Bangkok, Thailand, March 5-7, 2019.
- **Outstanding Paper Award** for the paper "Advanced Automation for SMEs in the I4.0 Revolution: Engineering Education and Employees Training in the Smart Mini Factory Laboratory", IEEM 2018 International Conference on Industrial Engineering and Engineering Management. Bangkok, Thailand, December 16-19, 2018.
- **Best Track Paper Award (Track Engineering Education)** for the paper "Safe Human-Machine Centered Design of an Assembly Station in a Learning Factory Environment", IEOM 2018 8th International Conference on Industrial Engineering and Operations Management. Bandung, Indonesia, March 6-8, 2018.
- **Best Track Paper Award (Track Sustainability in Supply Chain)** for the paper "Sustainable City Logistics through Shared Resource Concepts", IEOM 2018 8th International Conference on Industrial Engineering and Operations Management. Bandung, Indonesia, March 6-8, 2018.
- **Best Track Paper Award (Track Construction Management)** for the paper "Mobile On-site Factories – Scalable and Distributed Manufacturing Systems for the Construction Industry", IEOM 2015 5th International Conference on Industrial Engineering and Operations Management. Dubai, United Arab Emirates, March 3-5, 2015.
- **Overall Best Paper Award** for the paper "An AD based Design and Implementation Approach for Franchise-Networks with distributed manufacturing units", ICAD 2013 Seventh International Conference on Axiomatic Design. Worcester, USA, Juni 27-28, 2013.
- **Nomination for best dissertation 2013** – University of Stuttgart.

Awards in Teaching

- **Best Teacher Award 2022**, Faculty of Science and Technology, Free University of Bolzano.
- **Award for best performance in relationship with students 2018** in the graduate course "MSc. in Industrial Mechanical Engineering" (awarded by the Faculty of Science and Technology, Free University of Bolzano).
- **Award for best teaching in German in the undergraduate course 2017** "BSc. in Industrial and Mechanical Engineering" (awarded by the Faculty of Science and Technology, Free University of Bolzano).

- **Award for best performance in relationship with students 2017** a in the graduate course "MSc. in Industrial Mechanical Engineering" (awarded by the Faculty of Science and Technology, Free University of Bolzano).

Memberships

- **AITEM** – Regular member of Associazione Italiana di Tecnologie Maufatturiere (Italian Association of Manufacturing Technologies, Ing-Ind/16 sector).
- **EuroScience** – Associate Member of European Association for the Advancement of Science and Technology, organizer of ESOF Euro Science Open Forum as the largest biennial interdisciplinary meeting on science and innovation in Europe. Session coordination at ESOF 2020 in Udine, Italy.
- **World Manufacturing Foundation** – Member of the expert group in the World Manufacturing Forum 2020 Report and focus group leader for the coordination of the White Paper "AI as an enabler for long-term resilience in manufacturing" for the World Manufacturing Forum 2021.
- **International Association of Learning Factories (IALF)** – Since 2020 the Smart Mini Factory Lab is official member of the IALF network. Erwin Rauch is member of the Scientific Committee (responsible for the scientific quality of publications and conference proceedings of IALF) and member of the following working groups: (1) Digital Assistance Systems for Assembly, (2) AI for Manufacturing Systems, (3) Human-Robot Collaboration.
- **International Association of Axiomatic Design (IAAD)** – Member of the Executive Committee and Head of the Publication Committee (responsible for scientific publications and conference proceedings of IAAD).
- **European Professors of Industrial and Engineering Management (EPIEM)** – Steering Board member and coordinator of research projects in EPIEM.
- **International Association for Technological Development and Innovations (IATDI)** – Member, key note speaker in DSMIE conference in 2020 and Co-Editor of Conference Proceedings of DSMIE 2022.
- **Industrial Engineering and Operations Management (IEOM)** – Professional membership and coordinator of panels for Industry 4.0 and Engineering Education at IEOM conferences.
- **EDUNET World Association** – Association for promoting engineering education 4.0 in automation technology.
- **Marie Curie Alumni Association (MCAA)** – Regular Member.

Editorial activity

- **Editor in Chief** of Production & Manufacturing Research (Taylor & Francis) (ISSN 2169-3277), Scopus Q1, impact factor 3.407.
- **Editorial Board member** of Scientific Reports (Nature Publishing Group) (ISSN 2045-2322), inaugural member of the new Mechanical Engineering division, Scopus Q1, impact factor 5.133.
- **Editorial Board member** of International Journal of Technoethics (IGI Global), ISSN 1947-3451, Scopus Q2, impact factor 0.87.
- **Editorial Board member** of Sustainability (MDPI), ISSN 2071-1050, Scopus Q2, impact factor 3.251.
- **Editorial Board member** of Proceedings on Engineering Sciences (University of Kragujevac), ISSN 2620-2832, Scopus Q4.

- **Editorial Board member** of Journal of Engineering Sciences, ISSN 2312-2498
- **Editorial Board member** of Strategic Decisions and Risk Management, ISSN 2618-947X
- **Editorial Board member** of Frontiers in Control Engineering, specialty section Control and Automation Systems, ISSN 2673-6268.

Guest Editor:

- **Guest Editor for the Special Issue** "Digital Technologies as Enabling Strategies for the Sustainable Transition of Productive Systems" – Sustainability (MDPI), Q2, Impact Factor 3.889, ongoing, closes 31 October 2023. Guest Editors: Dr. Pasqualina Sacco – Fraunhofer Italia Research, Italy; Prof. Fabrizio Mazzetto – Free University of Bolzano, Italy; Prof. Erwin Rauch – Free University of Bolzano, Italy.
- **Guest Editor for the Special Issue** " Design Methods for Mechanical and Industrial Innovation" – Machines (MDPI), Q2, Impact Factor 2.428, ongoing, closes 31 March 2023. Guest Editors: Prof. Alessandro Giorgetti - Università degli Studi Rome, Italy; Prof. Gabriele Arcidiacono – Giuglielmo Marconi University, Italy; Prof. Christopher Brown – Worcester Polytechnic Institute, USA; Prof. Erik Puik – University of Applied Sciences Utrecht, Netherlands; Prof. Dr. Nakao Masayuki – University of Tokio, Japan; Dr. Erwin Rauch – Free University of Bolzano, Italy.
- **Managing Guest Editor for the Special Issue** "Next Generation of Smart, Sustainable and Resilient Manufacturing Systems" – Scientific Reports (Nature), Q1, Impact Factor 5.133, ongoing, closes 30 June 2022. Guest Editors: Dr. Erwin Rauch – Free University of Bolzano, Italy; Prof. David S. Cochran – Purdue University, Fort Wayne, USA; Prof. Kerstin Johansen – Jönköping University, Sweden; Dr. Susanne Vernim – Technical University of Munich, Germany.
- **Guest Editor for the Special Issue** "Modern Automation Technologies and Virtual Engineering for Sustainable Manufacturing" – International Journal of Reliability, Quality & Safety Engineering (IJRQSE), Q3, ongoing, closes 1 August 2022. Guest Editors: Prof. Brian Prasad – Knowledge Solution, USA; Prof. J. Paulo Davim – University of Aveiro, Portugal; Dr. Erwin Rauch – Free University of Bolzano, Italy and Dr. Tao Peng – Zhejiang University, China.
- **Guest Editor for the Special Issue** "Unlocking the potential of sustainable and circular manufacturing through digitalization" – IEEE Engineering Management Review (IEEE), Q4, Impact Factor 1.587, ongoing, closes 1 June 2022. Guest Editors: Prof. Johannes Fottner, Prof. Michael F. Zaeh, Prof. Magnus Froehling, Dr. Susanne Vernim – Technical University Munich, Germany; Dr. Erwin Rauch – Free University of Bolzano, Italy and Dr. Seyoum Eshetu Birkie – KTH Royal Institute of Technology, Sweden.
- **Managing Guest Editor for the Special Issue** "Design for Sustainability—Axiomatic Design Science and Applications" – Sustainability (MDPI), Q2, Impact Factor 3.251, ongoing, closes 30 April 2022. Guest Editors: Dr. Erwin Rauch and Prof. Dominik Matt – Free University of Bolzano, Italy; Prof. Nam Suh – MIT Masschussetts Insitute of Technology, USA; Prof. Miguel Cavique – Nova University Lisbon, Portugal; Prof. Christopher Brown – Worcester Polytechnic

Institute, USA; Prof. Gabriele Arcidiacono – Giuglielmo Marconi University, Italy.

- **Managing Guest Editor for the Special Issue** "Industry 4.0 for SMEs - Smart Manufacturing and Logistics for SMEs" – Sustainability (MDPI), Q2, Impact Factor 3.251, closed 31 March 2020. Guest Editors: Dr. Erwin Rauch – Free University of Bolzano, Italy and Dr. Manuel Woschank – Montanuniversität Leoben, Austria.

Book Editing:

- **Book Co-Editor** of the book "Advances in Design, Simulation and Manufacturing - Manufacturing and Materials Engineering" (Springer), to be published in 2023.
- **Book Co-Editor** of the book "Managing and Implementing the Digital Transformation", Lecture Notes in Networks and Systems (Springer), published in September 2022, ISSN 2367-3370.
- **Book Co-Editor** of the book "Advances in Design, Simulation and Manufacturing - Manufacturing and Materials Engineering" (Springer), published in 2022, ISBN 978-3-031-06025-0.
- **Book Co-Editor** of the book "Industry 4.0 for SMEs - Smart Manufacturing and Logistics for SMEs" (MDPI), published in 2020, ISBN 978-3-03936-567-8.

Reviewer activity

- International Journal of Information Management (Elsevier) 14.098
- Trends in Food Science & Technology (Elsevier) 12.563
- Journal of Industrial Information Integration (Elsevier) 10.063
- Journal of Cleaner Production (Elsevier), impact factor 9.297
- Journal of Manufacturing Systems (Elsevier), impact factor 8.633
- International Journal of Production Research (Elsevier), impact factor 8.43
- International Journal of Production Economics (Elsevier), impact factor 8.31
- Automation in Construction (Elsevier), impact factor 7.700
- Computers in Industry (Elsevier), impact factor 7.635
- Journal of Business Research (Elsevier) impact factor 7.550
- Journal of Manufacturing Technology Management (Emerald), impact factor 7.547
- Sustainable Materials and Technologies (Elsevier), impact factor 7.053
- Technovation (Elsevier), impact factor 6.606
- Journal of Intelligent Manufacturing (Springer), impact factor 6.378
- International Journal of Contemporary Hospitality Management (Emerald), impact factor 5.667
- Manufacturing Letters (Elsevier), impact factor 5.533
- Robotics and Computer-Integrated Manufacturing (Elsevier), impact factor 5.666
- Computers & Industrial Engineering (Elsevier), impact factor 5.431
- Journal of Building Engineering (Elsevier), impact factor 5.318
- European Management Journal (Elsevier), impact factor 5.075
- Sustainable Production and Consumption (Elsevier), impact factor 5.032
- Environmental Impact Assessment Review (Elsevier), impact factor 4.549
- Engineering Science and Technology, an International Journal (Elsevier), impact factor 4.360

- Technology in Society (Elsevier), impact factor 4.192
- CIRP Journal of Manufacturing Science and Technology (Elsevier), impact factor 3.602
- International Journal of Advanced Manufacturing Technology, impact factor 3.320
- Sustainability (MDPI), impact factor 3.251
- IEEE Transactions on Engineering Management (IEEE), impact factor 2.81
- Applied Sciences (MDPI), impact factor 2.679
- International Journal of Industrial Ergonomics (Elsevier), impact factor 2.656
- International Journal of Agile Systems and Management (Inderscience), impact factor 2.50
- International Journal of Sustainable Engineering (Taylor & Francis), impact factor 2.298
- International Journal of Health Care Quality Assurance (Emerald), impact factor 2.038
- AI for Engineering Design, Analysis, Manufacturing (Cambridge Univ. Press), impact factor 1.671
- Systems Engineering (Wiley), impact factor 1.449
- Reviewer for International Conferences (CIRP, IEEE, ICAD, IEOM,…).

Reviewer activity for funding agencies

- **European Commission** in the evaluation of grant applications in the call TWIN-TRANSITION (Green and Digital).
- **Expert and reviewer for the National Research Council (NRC) Canada** for validation of research projects regarding Smart Factories and Cyber-Physical Production Systems.
- **Expert and reviewer for the Dutch Research Council (NWO)** for validation of research projects regarding Industry 4.0 and Smart Manufacturing.
- **Expert and reviewer for the Australian Research Council (ARC)** for validation of research projects regarding Industry 4.0, Smart Manufacturing as well as resilient and sustainable production.
- **Expert and reviewer for the National Research and Development Agency Chile** for validation of research projects regarding Digitalization in Manufacturing.
- **Panel Member for the Portuguese Foundation for Science and Technology (FCT)** in the exploratory projects call of the Massachusetts Institute of Technology (MIT) Portugal program; for validation of research projects in the field of Digital Transformation in Manufacturing.
- **Expert and reviewer for KU Leuven (University of Leuven, Belgium)** for validation of research projects regarding sustainable and human-centred manufacturing.
- **Expert and reviewer for Technical University of Graz (Austria)** for validation of study curricula regarding sustainable and smart manufacturing.
- **Expert in the Italian digital register of independent scientific experts** for the scientific evaluation of Italian research.
- **Expert and reviewer for Finpiemonte** (Italy) for validation of research projects regarding Industry 4.0 (FESR 2014-2020)
- **Expert and reviewer for Regione Marche** (Italy) for validation of research projects regarding Sustainable Production (FESR 2014-2020).

Organization of workshops and conferences

Local conferences and events:

- Co-Chair of the **1st International Symposium on Industrial Engineering and Automation (ISIEA 2022)**, June 21-22, 2022 including a Special Session on Innovative Higher Education for Industry 4.0.
- Co-Chair of the **Bilateral Workshop on Human-Centred and Intelligent Manufacturing**, February 8, 2022. Organized by the Free University of Bolzano and the Technical University Vienna in Bolzano.
- Co-Chair of the **Bilateral Workshop on Smart and Sustainable Engineering Technologies**, November 11, 2021. Organized by the Free University of Bolzano and the Chiang Mai University in Bolzano.
- Co-Chair of the **Bilateral Workshop on Design of Smart Manufacturing Systems**, September 30, 2021. Organized by the Free University of Bolzano and Purdue University Fort Wayne, IN (online Workshop).
- Member of the **Organizing Committee of TFC21, The 21st ETRIA World Conference TRIZ FUTURE 2021**, Bolzano, Italy, September 22-24, 2021 (https://tfc21.events.unibz.it/).
- Co-Chair and lecturer at the **Summer School „Design of Complex Systems and AI in Design"** hosted by Free University of Bolzano with guest lecturers from Massacussetts Institute of Technologies (MIT) and Worcester Polytechnic Institute (WPI), July 13-15, 2021.
- Co-Chair and speaker at the **Online workshop "Introduction of Industry 4.0 in SMEs: Tools and potentials** for local SMEs within the project SME 4.0.
- Member of the Organizing Committee and lecturer at the **EUCLIDES International Week Industry 4.0: Technologies and Management**, 8-12 March, 2021, online, at Free University of Bolzano (https://industry40week.events.unibz.it/).
- Chair and organization of the international **"Workshop on Safety and Ergonomics for Collaborative Workspaces"**, January 31 2020 at the Free University of Bolzano
- Chair and speaker at **Project-Meeting of the Interreg Italia-Austria research project "Engineering Education 4.0"**, Bolzano (Italy), October 3rd 2019.
- Chair and lecturer at the **1st International Online Summer School on Axiomatic Design** hosted by Free University of Bolzano and Worcester Polytechnic Institute (WPI), USA, July 23-25 2019.
- Co-Chair and speaker at **2nd Stakeholder Workshop of the Interreg Italia-Austria research project "Engineering Education 4.0"**, Bolzano (Italy), May 29 2019.
- Co-Chair and speaker at **1st Stakeholder Workshop of the Interreg Italia-Austria research project "Engineering Education 4.0"**, Bolzano (Italy), February 22 2019.
- Co-Chair and speaker at **Kick-Off Event of the research project "ASSIST4WORK - Social sustainability in production through age-appropriate and disability-friendly workplace design using assistance systems"**, Bolzano (Italy), February 21 2019.
- Organizing committee of the **yearly meeting of Wissenschaftliche Gesellschaft für Arbeits- und Betriebsorganisation (WGAB) 2018** hosted at Bolzano, Italy, September 14-15 2018.

- Organizing committee of the **yearly annual meeting of Associazione Italiana Tecnologie Manifatturiere (AITEM) 2018** hosted at Bolzano, Italy, September 9-11 2018.
- Organizing committee and speaker at the **Summer School on Axiomatic Design** hosted at Bolzano, Italy, July 17-19 2018.
- Organizing committee and speaker at the **International Workshop "Eye tracking and biometric systems: breaking into industrial engineering"**, December 7 2017 at the Free University of Bolzano, Italy.
- Co-Chair and speaker at **Workshop with local SMEs in the EU project SME 4.0** to identify requirements of small and medium sized enterprises, Bolzano (Italy), June 9 2017.
- Co-Chair and speaker at the **"1st Annual Meeting SME 4.0 – Industry 4.0 for SMEs"**, February 8-9 2017 at the Free University of Bolzano, Italy.

International conferences and events:

- Member of the International Program Committee of the **4th International Conference on Innovative Intelligent Industrial Production and Logistics (IN4PL)**, 15-17 November, 2023 in Rome, Italy.
- Member of the program committee at the **6th International Conference on Design, Simulation, Manufacturing: The Innovation Exchange**, June 6-9 2023, High Tatras, Ukraine.
- Member of the program committee at the **6th Experiment@ International Conference 2023 (expat'23)**, June 5-7 2023, Évora, Portugal.
- Member of the International Scientific Committee of the **13th Conference on Learning Factories**, 9-11 May, 2023, Reutlingen, Germany.
- Co-Chair of the **International EDUNET World Conference (IEWC 2023)**, 1-3 March, 2023 organized by EDUNET World Association.
- Member of the International Scientific Committee of the **International Conference on Innovation and Transformation in the Digital Age**, 28-30 November, 2022 organized by University College London, UK.
- Member of the International Program Committee of the **3rd International Conference on Industry 4.0 and Smart Manufacturing (ISM)**, 17-19 November, 2022 in Linz, Austria.
- Member of the **International Scientific Committee of the 12th International Conference on Logistics & Transport (ICLT 2022)**, 17-19 November, 2022 in Krabi, Thailand.
- Member of the International Program Committee of the **3rd International Conference on Innovative Intelligent Industrial Production and Logistics (IN4PL)**, 24-26 October, 2022 in Valletta, Malta.
- Member of the Scientific Committee of **15th European Professors of Industrial Engineering and Management (EPIEM) Conference 2022**, June 1-4, 2022 in Graz, Austria.
- Member of the Scientific Committee of **3rd International (virtual) Conference on Quality, Innovation and Sustainability – ICQIS2022**, May 3-4, 2022 in Aveiro, Portugal.
- Member of the International Program Committee of the **2nd**

International Conference on Innovative Intelligent Industrial Production and Logistics (IN4PL), 25-27 October, 2021 in Valletta, Malta.

- Member of the International Scientific Committee of the **7th Collaborative European Research Conference (CERC 2021)**, 9-10 September, 2021 in Cork, Ireland.
- Program Committee at **InterPartner 2021 International Conference on Advanced Manufacturing Processes**, September 7-10, 2021 in Odessa, Ukraine.
- Member of the Scientific Committee at **4th European Conference on Industrial Engineering and Operations Management (IEOM 2021)**, Rome, Italy August 2-5, 2021.
- Member of the **Organizing Committee** and **International Scientific Committee of "14th International Conference on Axiomatic Design (ICAD 2021)**, Lisbon, Portugal June 23-25, 2021.
- Member of the program committee at the **4th International Conference on Design, Simulation, Manufacturing: The Innovation Exchange**, June 8-11 2021, Lviv, Ukraine.
- Member of the Scientific Committee of **14th European Professors of Industrial Engineering and Management (EPIEM) Conference 2021**, 28 May, 2021 in Graz, Austria.
- Member of the **Expert Group of the World Manufacturing Report 2020** regarding "AI in Manufacturing", presented at the World Manufacturing Forum (WMF), Cernobbio, Lake Como, Italy, November 11-12, 2020.
- Session Coordinator and speaker in the Session "Transfer of Industry 4.0 from research to practice" at **ESOF EuroScience Open Forum 2020** in Trieste (www.esof.eu/en), September 2-6, 2020, Trieste, Italy.
- Program Committee at **"InterPartner 2020 International Conference on Advanced Manufacturing Processes"**, September 8-11, 2020 in Odessa, Ukraine.
- Member of the **International Scientific Committee at "Collaborative European Research Conference (CERC 2020)"**, Belfast, Northern-Ireland September 10-12, 2020.
- Member of the program committee and key note speaker at the "**3rd International Conference on Design, Simulation, Manufacturing: The Innovation Exchange**", June 9-12 2020, Kharkiv, Ukraine.
- Co-Chair and speaker at the **"4th Annual Meeting "SME 4.0 – Industry 4.0 for SMEs"**, February 19-20 2020 at Technical University of Kosice, Slovakia.
- Program Committee at **"InterPartner 2019 International Conference on Advanced Manufacturing Processes"**, September 10-13, 2019, Odessa, Ukraine.
- Program committee at the **"2nd International Conference on Design, Simulation, Manufacturing: The Innovation Exchange"**, June 11-14 2019, Lutsk, Ukraine.
- Co-Chair and speaker at the **"3rd Annual Meeting SME 4.0 – Industry 4.0 for SMEs"**, January 30-31 2019 at Chiang Mai University, Thailand.
- Member of **European Academic Committee at "2nd European IEOM Conference Industrial Engineering and Operations**

Management”, Paris, France, July 26-27 2018.

- Co-Chair and speaker at the **“2nd Annual Meeting SME 4.0 – Industry 4.0 for SMEs”**, May 24-25 2018 at Montanuniversität Leoben, Austria.
- **Organization of 3 workshops at industrial companies in New England USA** within the research project "SME 4.0 - Industry 4.0 for SMEs" in November 2017. Industry partners: IG Marston in Holbrook, MA 02343; Bel Air Finishing Supply Corporation in North Kingstown, RI 02852 and Donahue Industries Inc. in Shrewsbury, MA 01545.
- Co-Chair and speaker at **Workshop with local SMEs in the EU project SME 4.0** to identify requirements of small and medium sized enterprises, Worcester, MA (USA), September 28 2017.
- **Session Chair** of numerous international conferences.

Technology transfer

Head of the learning factory lab "Sustainable Manufacturing Lab" at NOI Techpark Bruneck – in phase of set-up and ramp-up.

Head of the learning factory lab "Smart Mini Factory - laboratory for Industry 4.0" with a budget of over 1,5 mio. Euro (capacity building funding of the Autonomous Province of Bolzano) and 20 professors, researchers, PhD students, project assistants and lab technicians from different disciplines involved. The aim is to create a platform where researcher, students and enterprises meet each other and work in an interdisciplinary way on applied research projects. Students have the possibility to participate in research projects with companies and have the opportunity to collaborate with high-qualified staff from research.

- **Mission 1 (RESEARCH):** Conduct internationally competitive basic and applied research on Smart Manufacturing and Industrial Automation.
- **Mission 2 (TEACHING):** Increase qualification regarding Industry 4.0 and digitalization in South Tyrol. The Smart Mini Factory lab offers training courses on Industry 4.0 topics for professionals from companies as well as for students and teachers from technical High Schools.
- **Mission 3 (INDUSTRY):** Collaboration with local industry and craftsmanship (commissioned research, sponsorship of phd students or participation in third party funding research programmes).

Third mission

- **Organization of 3 course modules** within the ESF/FSE funded Smart Enterprise Qualification Program to qualify professionals from local industry, October 2022 – March 2023.
- **Organization of trainings and webinars on Industry 4.0 topics for professionals from industry** in the Smart Mini Factory lab (~200 participants).
- **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).
- **Organization of a series of 9 seminars on Industry 4.0 topics for High School students** in the Smart Mini Factory lab together with Bitz Fablab and NOI Maker Space.
- **Coordination of the Digital Technology Summer Camp 2021 and 2022**: summer camp of 2 week training for high school students in collaboration with Bitz Fablab.

- **Yearly workshop at the Smart Mini Factory** lab by a group of high school students, initiative "Rendevouz mit dem Traumberuf".
- **Member of the Jury for the Digital Talent Competition** for high schools within the Interreg project Engineering Education 4.0 – coordination of the competition in South Tyrol. March 2021.
- Yearly 2 x 4 hours of **lecture in "Tools and methods in Industrial Engineering"** for 5th classes at Technical Highschool Max Valier (~90 participants); during Covid as online format
- Collaboration with **associations and stakeholder groups**.
- 2019: **Radio lecturer for UNI Radio** on RAI Südtirol (three radio-lectures on Industry 4.0 in 2019). Link: http://www.raibz.rai.it/feed.php?id=83.
- **Lecturer in the diploma course "Praxislehrgang Digitale Transformation"** of the craftsmanship association lvh-apa with the module "Digital Production"
- **Lecturer in the diploma course "Lehrgang Innovation und Digitalisierung"** of the Chamber of Commerce of Bolzano with the module "Change Management"
- **TV-broadcast of collaboration with industry in "Sendereihe CAMPUS", Rai Sender Bozen**, December 6, 2018 (https://www.youtube.com/watch?v=LF4tNWEJ2uc)
- **Lecturer in the diploma course "Lehrgang Innovationsverantwortliche"** of the Chamber of Commerce of Bolzano with the module "Innovationen strukturiert planen"
- **White Papers with industry:** World Manufacturing Forum 2021 in collaboration with prestigious large international companies and innovative start ups. White Paper 1 (undersigned in the lead): AI as an Enabler for Long-Term Resilience in Manufacturing (https://worldmanufacturing.org/wp-content/uploads/06_Rauch-1.pdf); White Paper 2 (undersigned as member of the editorial team): The Evolving Role of Competence Centres for Long Term Resilience in Manufacturing (https://worldmanufacturing.org/wp-content/uploads/04_Erdem-1.pdf). White Paper with the local company Solunio srl from Bruneck: Der Wandel vom traditionellen Lean ShopFloor Management zum Digitalen Shopfloor Management in Echtzeit. White Paper, 2019. Electronically published: https://www.produktion.de/whitepaper/digitales-shopfloor-management-in-echtzeit.html.
- **Industry 4.0 seminars and lab visit for high schools in South Tyrol** (~20-40 per year)
- Opening and tours/demonstrations in the Smart Mini Factory Lab during **Open Day**
- **Coordination of "matura projects"** of the Technical High School in Bolzano (RFID, Assembly line project, Industry 4.0 assessment website, delta robot, gripper for cobot)
- **Speaker and Workshop Leader** "Collaborative Robotics and Workplaces" - Digital Talent Day 2019, Chamber of Commerce of Bolzano, December 9 2019.
- **Presentations of the engineering study courses** at local High Schools in Bozen, Schlanders, Meran, Brixen and Bruneck.
- **Coordination of the third mission project "Uni meets School" since 2010** – a project with High Schools of the Province of Bolzano, giving students the opportunity to gain 2 credit points in an optional

course at the Free University of Bolzano.

- **Initiation and coordination of a Newsletter Series on Industry 4.0 in cooperation with the Chamber of Commerce**, 8 newsletters with theoretical background on emerging technologies: https://www.handelskammer.bz.it/de/dienstleistungen/digitalisierung/praxiswissen/fachbeiträge.
- **Initiation and coordination of a Newsletter Series on Best Practices on Industry 4.0**, see best practices of Durst Group, Finstral, Progress 3D Innovation, alpitronic, Solunio and Mader. https://www.handelskammer.bz.it/de/dienstleistungen/digitalisierung/praxiswissen/best-practice.

Institutional activities

- **Member of the RIS3 working group "Automation/ Automotive"** of the Autonomous Province of Bolzano.
- **Delegate for Third Mission at the Faculty of Engineering** of the Free University of Bolzano
- **Member of the working group for the European Digital Innovation Hub** call – Work Package "Smart Manufacturing" for initiatives in "Test before Invest", Sept 2021 - Dec 2021
- **Second member** of the study course council for the Master in Industrial Mechanical Engineering (LM-33) from the start of the program in 2016/17 until 2022.
- **Coordination of issues related to the Double Degree program** with Otto von Guericke University of Magdeburg (Germany) within LM-33.
- Member of the PhD program **ASE (Advanced Systems Engineering)** a.y. 2019-20 - today
- Member of the PhD program **SET (Sustainable Energy and Technologies)** a.y. 2018-19
- **Responsible for Safety** in the Smart Mini Factory lab.
- Member in numerous **commissions for recruitment** of research and teaching staff
- Member of the **commission for selection of candidates** in the course LM-33 Master in Industrial Mechanical Engineering as well as the AES PhD program.
- Member of the **AQ (Quality Assurance) commission** in the LM-33 Master in Industrial Mechanical Engineering
- **Reference lecturer** in the MIUR database for the Master in Industrial Mechanical Engineering (LM-33)
- **Tutor** in the L-9 Bachelor in Industrial and Mechanical Engineering
- **Tutor** in the LM-33 Master in Industrial Mechanical Engineering
- **Presentation of the study programme LM-33** Master in Industrial Mechanical Engineering at Open Day and other events
- **Presentation on Industry 4.0 and lab visit** for yearly English Intensive classes of the Language Centre of unibz organized by Dr. Ennis M. Joseph
- **Working Group for the submission of an Erasmus Mundus Design Measure** for the development of an Erasmus Mundus Master on Digital and Sustainable Manufacturing (PI Prof. Renato Vidoni) together with other 3-5 European universities and a lump sum budget of 55.000 Euro (June 2021)

Further trainings

- Regular **occupational safety trainings** for lab responsible

- **"ERC Training course"** on how to write a successful ERC proposal – Enspire-Science Consulting, 20.06.2018.
- Training course on **"E-Learning and video-lecturing"** – internal training course at Free University of Bolzano-Bozen, 25.09.2019.
- **Gender Equality Training** course: Fairness and Anti-Bias in hiring procedures for professorships, 4 hours on 22. May 2023.

Language competence

German: first language
Italian: C1 - bilingualism certificate of the Province of Bolzano, A-level
English: C1 – Cambridge CAE

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 March 21, 2024

Publication list - ERWIN RAUCH

Bibliometric data

Total documents in Scopus = **158**

Number of citations in Scopus = **3.593**

H-index in Scopus = **34**

The undersigned is with 95 publications **author #1 in Scopus database regarding published works on "Industry 4.0"** and contributed therefore significantly to make the Free University of Bozen-Bolzano an internationally recognized research institution with regard to the Fourth Industrial Revolution (>2/3 of the published works of unibz on Industry 4.0 are authored by the undersigned). This puts unibz under the 10 universities with most publications on Industry 4.0.

Summary of scientific publications (published and accepted)**:**

Journal articles	57
Books	4
Book chapters	19
Conference papers	113
White Papers / Reports	4
National and trade magazines	25
TOTAL	**222**

Journal articles (57)

1. ARUVÄLI, T., DE MARCHI, M. & **RAUCH, E.**: Analysis of quantitative metrics for assessing resilience of human-centered CPPS workstations. Scientific Reports (Nature), 2023, 13, 2914. DOI: 10.1038/s41598-023-29735-1. **Scopus indexed** (Quartile 1, impact factor 4.996).

2. GUALTIERI, L., **RAUCH, E.**, & VIDONI, R.: Human-robot activity allocation algorithm for the redesign of manual assembly systems into human-robot collaborative assembly. International Journal of Computer Integrated Manufacturing, 2023, 1-26. DOI: 10.1080/0951192X.2022.2083687. **Scopus indexed** (Quartile 1, impact factor 3.205).

3. GUALTIERI, L.; FRABONI, F.; DE MARCHI, M.; **RAUCH, E.**: Development and evaluation of design guidelines for cognitive ergonomics in human-robot collaborative assembly systems. Applied Ergonomics, 2022, 104, 103807. DOI: 10.1016/j.apergo.2022.103807. **Scopus indexed** (Quartile 1, impact factor 4.30).

4. MARK, B. G., **RAUCH, E.**, MATT, D. T.: Systematic selection methodology for worker assistance systems in manufacturing. Computers & Industrial Engineering, 2022, 166, 107982. DOI: 10.1016/j.cie.2022.107982. **Scopus indexed** (Quartile 1, impact factor 5.431).

5. GUALTIERI, L.; **RAUCH, E.**; VIDONI, R.: Development and validation of guidelines for safety in human-robot collaborative assembly systems. Computers and Industrial Engineering, 2022, 163, 107801. DOI: 10.1016/j.cie.2021.107801. **Scopus indexed** (Quartile 1, impact factor 5.431).

6. MARK, B.G.; **RAUCH, E.**; MATT, D.T.: Worker assistance systems in manufacturing: A review of the state of the art and future directions. Journal of Manufacturing Systems, 2021, 59, pp. 228-250. DOI: 10.1016/j.jmsy.2021.02.017. **Scopus indexed** (Quartile 1, impact factor 8.633).

7. MATT, D. T.; **RAUCH, E.**: Biological Transformation in Manufacturing: Overview and Fields of Application. IEEE Engineering Management Review, 2021, 49(4), pp. 115-122. DOI: 10.1109/EMR.2021.3126748. **Scopus indexed** (Quartile 3, impact factor 1.590).

8. FRANCALANZA, E.; BORG, J.; **RAUCH, E.**; PUTNIK, G. D.; ALVES, C.; LUNDGREN, M.; AMZA, C.: Specifications for a Digital Training Toolbox for Industry 4.0. FME Transactions, 2021, 49(4), 886-893. DOI: 10.5937/fme2104893F. **Scopus indexed** (Quartile 2, impact factor 1.77).

9. BORG, J.; FRANCALANZA, E.; **RAUCH, E.**; PUTNIK, G.; AMZA, C.; LUNDGREN, M.; ALVES, C.; ZAMMIT, M.S.; VELLA, P.: An Industry 4.0 Training Framework Addressing 'COVID-19 Type' Disruptions on Manufacturing. Digital Manufacturing Technology, 2021, 1(1), pp. 60-80. DOI: 10.37256/dmt.112021921.

10. GUALTIERI, L.; **RAUCH, E.**; VIDONI, R.: Emerging Research Fields in Safety and Ergonomics in Industrial Collaborative Robotics: a Systematic Literature Review. Robotics and Computer-Integrated Manufacturing, 2021, 67, 101998. DOI: 10.1016/j.rcim.2020.101998. **Scopus indexed** (Quartile 1, impact factor 5.666, **listed as one of the most downloaded articles in the last 90 days**.

11. GUALTIERI, L.; **RAUCH, E.**; VIDONI, R.: Methodology for the definition of the optimal assembly cycle and calculation of the optimized assembly cycle time in human-robot collaborative assembly. International Journal of Advanced Manufacturing Technology, 2021, 113(7-8), pp. 2369-2384. DOI: 10.1007/s00170-021-06653-y. **Scopus indexed** (Quartile 1, impact factor 3.320).

12. PALOMBA, I.; GUALTIERI, L.; ROJAS, R.; **RAUCH, E.**; VIDONI, R.; GHEDIN, A.: Mechatronic re-design of a manual assembly workstation into a collaborative one for wire harness assemblies. Robotics, 2021, 10(1), 43. DOI: 10.3390/robotics10010043. **Scopus indexed** (Quartile 2, impact factor 2.940).

13. EMER, A.; UNTERHOFER, M.; **RAUCH, E.**: A Cybersecurity Assessment Model for Small and Medium-Sized Enterprises. IEEE Engineering Management Review, 2021, 49(2), 9424999. DOI: 10.1109/EMR.2021.3078077. **Scopus indexed** (Quartile 3, impact factor 1.590). Contribution: conceptualization, methodology, supervision, writing-reviewing-editing.

14. BROZZI, R.; **RAUCH, E.**; RIEDL, M.; MATT, D.T.: Industry 4.0 roadmap for SMEs: validation of moderation techniques for creativity workshops. International Journal of Agile Systems and Management, 2021, 14(2), pp. 276-291. DOI: 10.1504/IJASM.2021.118064. **Scopus indexed** (Quartile 1, impact factor 2.500).

15. ROJAS, R.; **RAUCH, E.**; MATT, D.T.: Research Fields and Challenges to implement Cyber-Physical Production Systems in SMEs: A Literature Review. Chiang Mai University Journal of Natural Sciences, 2021, 20(2), e2021022. DOI: 10.12982/CMUJNS.2021.022. **Scopus indexed** (Quartile 3, impact factor 0.492).

16. **RAUCH, E.**; UNTERHOFER, M.; NAKKIEW, W.; BAISUKHAN, A.; MATT, D.T.: Potential of the Application of Additive Manufacturing Technology in European SMEs. Chiang Mai University Journal of Natural Sciences, 2021, 20(2), e2021023. DOI: 10.12982/CMUJNS.2021.023. **Scopus indexed** (Quartile 3, impact factor 0.492).

17. **RAUCH, E.**; VICKERY, A.R.: Systematic Analysis of Needs and Requirements for the Design of Smart Manufacturing Systems in SMEs. Journal of Computational Design and Engineering, 2020, 7(2), pp. 129-144. DOI: 10.1093/jcde/qwaa012. **Scopus indexed** (Quartile 1, impact factor 5.860).

18. **RAUCH, E.**; LINDER, C.; DALLASEGA, P.: Anthropocentric Perspective of Production before and within Industry 4.0. Computers and Industrial Engineering, 2020, 139, 105644. DOI: 10.1016/j.cie.2019.01.018. **Scopus indexed** (Quartile 1, impact factor 5.431, **listed as one of the most cited articles published by CAIE since 2018**.

19. MATT, D.T.; ORZES, G.; **RAUCH, E.**; DALLASEGA, P.: Urban Production – a Socially Sustainable Factory Concept to overcome Shortcomings of Qualified Workers in Smart SMEs. Computers and Industrial Engineering, 2020, 139, 105384. DOI: 10.1016/j.cie.2018.08.035. **Scopus indexed** (Quartile 1, impact factor 5.431).

20. **RAUCH, E.**; MATT, D.T.; LINDER, C.: Lean Management in Hospitality: Methods, Applications and Future Directions. International Journal of Service and Operations Management, 2020, 36(3), pp. 303-326,. DOI: 10.1504/IJSOM.2020.108115. **Scopus indexed** (Quartile 2, impact factor 0.78).

21. WOSCHANK, M.; **RAUCH, E.**; ZSIFKOVITS, H.: A review of further directions for artificial intelligence, machine learning, and deep learning in smart logistics. Sustainability (Special Issue Industry 4.0 for SMEs - Smart Manufacturing and Logistics for SMEs), 2020, 12(9), 3760. DOI: 10.3390/su12093760. **Scopus indexed** (Quartile 1, impact factor 3.251).

22. BROZZI, R.; FORTI, D.; **RAUCH, E.**; MATT, D.T.: The advantages of industry 4.0 applications for sustainability: Results from a sample of manufacturing companies. Sustainability (Special Issue Industry 4.0 for SMEs - Smart Manufacturing and Logistics for SMEs), 2020, 12(9), 3647. DOI: 10.3390/su12093647. **Scopus indexed** (Quartile 1, impact factor 3.251).

23. GUALTIERI, L.; PALOMBA, I.; MERATI, F.A.; **RAUCH, E.**; VIDONI, R.: Design of human-centered collaborative assembly workstations for the improvement of operators' physical ergonomics and production efficiency: A case study. Sustainability (Special Issue Industry 4.0 for SMEs - Smart Manufacturing and Logistics for SMEs), 2020, 12(9), 3606. DOI: 10.3390/su12093606. **Scopus indexed** (Quartile 1, impact factor 3.251).

24. **RAUCH, E.**; UNTERHOFER, M.; ROJAS, R.; GUALTIERI, L.; WOSCHANK, M.; MATT, D.T.: A maturity level-based assessment tool to enhance the implementation of industry 4.0 in small and medium-sized enterprises. Sustainability (Special Issue Industry 4.0 for SMEs - Smart Manufacturing and Logistics for SMEs), 2020, 12(9), 3559. DOI: 10.3390/SU12093559. **Scopus indexed** (Quartile 1, impact factor 3.251).

25. MATT, D.T.; RIEDL, M.; **RAUCH, E.**: Die Natur als Inspiration - Rolle der biologischen Transformation zur zukünftigen Gestaltung von Produktionssystemen (Nature as inspiration - the role of biological transformation in the future design of production systems). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, 2020, 115(3), pp. 158-161. DOI: 10.3139/104.112235. **Scopus indexed** (Quartile 2, impact factor 0.39).

26. DALLASEGA, P.; ROJAS, R.; BRUNO, G.; **RAUCH, E.**: An Agile Scheduling and Control Approach in ETO Construction Supply Chains. Computers in Industry, 2019, 112, 103122. DOI: 10.1016/j.compind.2019.08.003. **Scopus indexed** (Quartile 1, impact factor 7.635).

27. ROJAS, R.; **RAUCH, E.**: From a Literature Review to a Conceptual Framework of Enablers for Smart Manufacturing Control. The International Journal of Advanced Manufacturing Technology, 2019, 104(1-4), pp. 517-533. DOI: 10.1007/s00170-019-03854-4. **Scopus indexed** (Quartile 1, impact factor 3.320).

28. BEDNAR, S.; **RAUCH, E.**: Modeling and application of configuration complexity scale: concept for customized production. International Journal of Advanced Manufacturing Technology, 2019, 100(1-4), pp. 485-501. DOI: 10.1007/s00170-018-2659-5. **Scopus indexed** (Quartile 1, impact factor 3.320).

29. MARK, B.G.; HOFMAYER, S.; **RAUCH, E.**; MATT, D.T.: Inclusion of Workers with Disabilities in Production 4.0: Legal Foundations in Europe and Potentials Through Worker Assistance Systems. Sustainability, 2019, 11(21), 5978. DOI: 10.3390/su11215978. **Scopus indexed** (Quartile 2, impact factor 3.251).

30. MATT, D.T.; **RAUCH, E.**; UNTERHOFER, M.; RIEDL, M.; BROZZI, R.: Industrie 4.0 Assessment als Orientierungshilfe für KMUs - Bewertungsmodell zur Festlegung und Priorisierung von Industrie 4.0 Umsetzungsmaßnahmen in KMUs (Industry 4.0 Assessment - A guide for SMEs - Assessment model for defining and prioritising industry 4.0 implementation measures in SMEs). Industrie 4.0 Management, No. 3, 2019.

31. **RAUCH, E.**; RUSSO SPENA, P.; MATT, D.T.: Axiomatic Design Guidelines for the Design of Flexible and Agile Manufacturing and Assembly Systems for SMEs. International Journal on Interactive Design and Manufacturing, 2019, 13(1), pp. 1-22. DOI: 10.1007/s12008-018-0460-1. **Scopus indexed** (Quartile 2, impact factor 2.681). **ADRF Park's Prize for best journal paper on Axiomatic Design**.

32. MATT, D.T.; ORZES, G.; PEDRINI, G.; BELTRAMI, M.; **RAUCH, E.**: Roadmap in eine Digitale Welt: Auf dem Weg in eine Digitale Welt – Die Digitale Roadmap für die Makroregion Tirol-Veneto (Roadmap into a Digital World: On the Way to a Digital World - The Digital Roadmap for the Tyrol-Veneto Macroregion). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, 2019, 114(9), pp. 576-579. DOI: 10.3139/104.112136. **Scopus indexed** (Quartile 1, impact factor 0.44).

33. MARK, B.G.; **RAUCH, E.**; BORGIANNI, Y.; MATT, D.T.: Eye Tracking in der Produktion 4.0: Eye Tracking als nützliche Technologie zur Optimierung der Produktionsprozesse im Zeitalter von Industrie 4.0 (Eye Tracking in Production 4.0 - Eye Tracking as a useful Technology for Improving Production Processes in the Age of Industry 4.0). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, 2019, 114(1-2), pp. 72-75, 2019. DOI: 10.3139/104.112032. **Scopus indexed** (Quartile 1, impact factor 0.44).

34. **RAUCH, E.**; DALLASEGA, P.; UNTERHOFER, M.: Requirements and Barriers for Introducing Smart Manufacturing in Small and Medium-Sized Enterprises. IEEE Engineering Management Review, 2019, 47(3), pp. 87-94, 2019. DOI: 10.1109/EMR.2019.2931564. **Scopus indexed** (Quartile 3, impact factor 1.590).

35. DALLASEGA, P.; **RAUCH, E.**; LINDER, C.: Industry 4.0 as an Enabler of Proximity for Construction Supply Chains: A Systematic Literature Review. Computers in Industry, Vol. 99, 2018, pp. 205-225. DOI: 10.1016/j.compind.2018.03.039. **Scopus indexed.** (Quartile 1, impact factor 7.635).

36. ROJAS, R.; **RAUCH, E.**; MATT, D.T.: Vernetzung in Cyber-Physischen Produktionssystemen: Dreistufiges Industrial Internet Systemmodell zur Vernetzung von heterogenen Elementen in Cyber-Physischen Produktionssystemen (Connectivity in Cyber-Physical Production Systems: Three-Tier Industrial Internet System Model for Connectivity of heterogeneous Elements in Cyber-Physical Production Systems). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, Vol. 113, No. 3, in press, 2018. DOI: 10.3139/104.111886. **Scopus indexed.** (Quartile 2, impact factor 0.44).

37. DALLASEGA, P.; **RAUCH, E.**; FROSOLINI, M.: A Lean Approach for Real-Time Planning and Monitoring in Engineer-to-Order Construction Projects. Buildings, Vol. 8, No. 3, 2018, Article ID 38. DOI: 10.3390/buildings8030038. **Scopus indexed.** (Quartile 1, impact factor 2.648).

38. MATT, D.T.; ARCIDIACONO, G.; **RAUCH, E.**: Applying Lean to Healthcare Delivery Processes – a Case-based Research. International Journal on Advanced Science, Engineering and Information Technology, Vol. 8, No. 1, 2018, pp. 123-133. DOI: 10.18517/ijaseit.8.1.4965. **Scopus indexed.** (Quartile 2, impact factor 1.059).

39. **RAUCH, E.**; DALLASEGA, P.; MATT, D.T.: Complexity reduction in engineer-to-order industry through real-time capable production planning and control. Production Engineering Research and Development, Vol. 12, No. 3-4, 2018, pp. 341-352. DOI: 10.1007/s11740-018-0809-0. Scopus indexed. **Scopus indexed.** (Quartile 2).

40. **RAUCH, E.**; ROJAS, R.; DALLASEGA, P.; MATT D.T.: Smart Shopfloor Management - Anforderungen an ein digitales und intelligentes Shopfloor Management im Zeitalter von Industrie 4.0 (Smart Shopfloor Management - Requirements for a digital and smart shop floor management in the age of Industry 4.0). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, Vol. 113, No. 1/2, 2018, pp. 17-21. DOI: 10.3139/104.111854. **Scopus indexed.** (Quartile 2, impact factor 0.44).

41. **RAUCH, E.**; UNTERHOFER, M.; DALLASEGA, P.: Industry Sector Analysis for the Application of Additive Manufacturing in Smart and Distributed Manufacturing Systems. Manufacturing Letters, 2018, Vol. 15, Part B, pp. 126-131. DOI: 10.1016/j.mfglet.2017.12.011. **Scopus indexed** (Quartile 1, impact factor 5.533).

42. **RAUCH, E.**; DALLASEGA, P.; MATT D.T.: Distributed manufacturing network models of smart and agile mini-factories. International Journal of Agile Systems and Management, Vol. 10, No. 3/4, 2017, pp. 185-205. DOI: 10.1504/IJASM.2017.088534. **Scopus indexed.** (Quartile 1, impact factor 2.50).

43. **RAUCH, E.**; DALLASEGA, P.: Sustainable construction supply chains through synchronized production planning and control in engineer-to-order enterprises.

Sustainability, Vol. 9, No. 10, Article ID 1888, 2017. DOI: 10.3390/su9101888. **Scopus indexed.** (Quartile 2, impact factor 3.251).

44. ARCIDIACONO, G.; MATT, D.T.; **RAUCH, E.**: Axiomatic Design of a Framework for the Comprehensive Optimization of Patient Flows in Hospitals. Journal of Healthcare Engineering, Article ID 2309265, 2017. DOI:10.1155/2017/2309265. **Scopus indexed.** (Quartile 3, impact factor 2.682).

45. SEIDENSTRICKER, S.; **RAUCH, E.**; DALLASEGA, P.: Industrie-4.0-Geschäftsmodellinnovation für KMU: Neun-Felder-Matrix und morphologische Analyse zur Ableitung und Gestaltung von informationsbasierten Industrie-4.0-Geschäftsmodellen für KMU (Industry 4.0 Business Model Innovation for SMEs – Nine-Field Matrix and Morphological Analysis for the Identification and the Design of Information-based Industry 4.0 Business Models for SMEs). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, Vol. 112, No. 9, 2017, pp. 616-620. DOI: 10.3139/104.111776. **Scopus indexed.** (Quartile 2, impact factor 0.44).

46. MATT, D.T.; RIEDL, M.; **RAUCH, E.**: Industrie 4.0: Wissenstransfer und Kompetenzprofile - Wissenstransfer und Kompetenzprofile für die smarte Fabrik (Industry 4.0: Knowledge transfer and competence profiles - Knowledge transfer and competence profiles for the smart factory). Industriemanagement, No. 3, 2017.

47. **RAUCH, E.**; SEIDENSTRICKER, S.; DALLASEGA, P.; HAMMERL, R.: Collaborative Cloud Manufacturing: Design of Business Model Innovations enabled by Cyber-Physical Systems in Distributed Manufacturing Systems. Journal of Engineering, Article ID 1308639, 2016. DOI: 10.1155/2016/1308639. **Scopus indexed.** (Quartile 3, impact factor 1.52).

48. **RAUCH, E.**; DALLASEGA, P.; MATT, D.T.: Sustainable production in emerging markets through Distributed Manufacturing Systems (DMS). Journal of Cleaner Production, Vol. 135, 2016, pp. 127-138. DOI: 10.1016/j.jclepro.2016.06.106. **Scopus indexed.** (Quartile 1, impact factor 9.297).

49. MATT, D.T.; **RAUCH, E.**; FRACCAROLI, D.: Smart Factory für den Mittelstand - Gestaltung eines ganzheitlichen Produktionssystems nach der Industrie 4.0 Vision in kleinen und mittelständischen Unternehmen (Smart Factory for SMEs - Designing a holistic production system by the industry 4.0 vision in small and medium sized enterprises). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, Vol. 111, No. 1-2, 2016, pp. 52-55. DOI: 10.3139/104.111471. **Scopus indexed.** (Quartile 2, impact factor 0.44).

50. MATT, D.T.; **RAUCH, E.**: Industrie 4.0 - Arbeitsorganisation in der Urbanen Fabrik von morgen (Industry 4.0 - Organization of work in the urban factory of the future). Industriemanagement, Vol. 31, No. 3, 2015.

51. MATT, D.T.; **RAUCH, E.**; DALLASEGA, P.; VIDONI, R.; RUSSO SPENA, P.: Synchronisierung von ETO-Fertigung und Baustellenmontage (Synchronisation of ETO-manufacturing and on-site installation). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, Vol. 110, No. 1/2 2015, pp. 9-13. DOI: 10.3139/104.111276. **Scopus indexed.** (Quartile 2, impact factor 0.44).

52. MATT, D.T.; **RAUCH, E.**; FRANZELLIN, V.M.: An Axiomatic Design based approach for the patient-value oriented design of a sustainable Lean Healthcare System. International Journal of Procurement Management, Special Issue on: Smart and Sustainable

Healthcare Supply Chain, Vol. 8, No. 1/2, 2015, pp. 66-81, DOI: 10.1504/IJPM.2015.066288. **Scopus indexed.** (Quartile 2, impact factor 1.45).

53. MATT, D.T.; FRANZELLIN, V.M.; **RAUCH, E.**: Lean Hospital - Mit Motivation und Methode zum schlanken Krankenhausbetrieb (Lean Hospital - with motivation and method to lean hospital operation). das Krankenhaus, Vol. 106, 2014, pp. 538-542, ISSN: 0340-3602.

54. MATT, D.T.; **RAUCH, E.**: Design of a scalable modular production system for a two-stage food service franchise system: a case analysis. International Journal of Engineering Business Management, Vol. 32, No. 4, 2012, pp. 1-10. DOI: 10.5772/51648. **Scopus indexed.** (Quartile 4, impact factor 2.24).

55. MATT, D.T.; **RAUCH, E.**; FRANZELLIN, V.M.: Wissensarbeit in Kleinunternehmen am Beispiel des Baugewerbes (Knowledge Management in small firms using the example of the construction industry). Industriemanagement, Vol. 28, No. 3, 2012, pp. 21-24, GITO Verlag, Berlin, Germany. ISSN 1434-1980.

56. MATT, D.T.; FRANZELLIN, V.M.; **RAUCH, E.**: Kundennutzenorientierte Strategieentwicklung (customer focused strategy development). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, Vol. 105, No. 7/8 2010, pp. 700-705, Carl Hanser Verlag, Munich, Germany. ISSN 0947-0085. **Scopus indexed.** (Quartile 2, impact factor 0.44).

57. GSCHIRR, M.; BAUR, G.; **RAUCH, E.**: Montagesystemplanung für die schlanke Produktion (Assembly system planning for lean production). Zeitschrift für wirtschaftlichen Fabrikbetrieb ZWF, Vol. 104, No. 5, 2009, pp. 348-352, Carl Hanser Verlag, Munich, Germany. ISSN 0947-0085. **Scopus indexed.** (Quartile 2, impact factor 0.44).

Books (5)

58. IVANOV, V.; TROJANOWSKA, J.; PAVLENKO, I.; **RAUCH, E.**; PITEĽ, J.: Advances in Design, Simulation and Manufacturing VI: Proceedings of the 6th International Conference on Design, Simulation, Manufacturing: The Innovation Exchange, DSMIE-2023, June 6–9, 2023, High Tatras, Slovak Republic - Volume 1: Manufacturing Engineering, Cham: Springer, 2023, ISBN 978-3-031-32766-7, 413 pages.

59. MATT, D. T.; **RAUCH, E.**; DALLASEGA, P.; VIDONI, R.: Industry 4.0 and Digital Transformation in SME Manufacturing and Engineering Education - Proceedings of the 1st International Symposium on Industrial Engineering and Automation ISIEA 2022, Cham: Springer, in press, to be published in June 2022, 300 pages.

60. IVANOV, V.; TROJANOWSKA, J.; PAVLENKO, I.; **RAUCH, E.**; PERAKOVIĆ, D.: Advances in Design, Simulation and Manufacturing, Volume 1: Manufacturing and Materials Engineering, Cham: Springer, 2022, ISBN 978-3-031-06025-0, 575 pages.

61. **RAUCH, E.;** WOSCHANK, M.: Industry 4.0 for SMEs - Smart Manufacturing and Logistics for SMEs. Basel: MDPI, 2020, ISBN 978-3-03936-567-8.

62. **RAUCH, E.**: Konzept eines wandlungsfähigen und modularen Produktionssystems für Franchising-Modelle (Concept of a changeable and modular production system for franchising models). Stuttgart: Fraunhofer Verlag, 2013, Dissertation. ISBN 978-3-8396-0585-1.

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