

Program for 52nd International Symposium on Robotics

Time	General	Room 1	Room 2	Room 3	Room 4
Wednesday, December 9					
09:15-09:30		Welcome			
09:30-10:10		Prof. Dr. Anna Valente "Autonomous Robots in Manufacturing: Challenges and Trends"			
10:10-10:50		Prof. Dr. Alin Albu-Schäffer "Service Robotics: From Space to Industrial Manufacturing and Healthcare"			
10:50-11:10	Coffee Break & Networking			Poster Session	
11:45-12:45	Lunch Break				
12:45-13:45		Industrial Robots	Mobile Robotics		Business Track
13:45-14:25		Carl Doeksen "3M's Automation Journey: Driving Growth & Productivity for our customers"			
14:25-14:45	Coffee Break & Networking			Poster Session	
14:45-15:45		Components and Technologies			Business Track
15:45-16:05					
16:05-17:05		IERA Session			
Thursday, December 10					
09:00-10:20		Control	Future of Work		
10:20-10:40	Coffee Break & Networking			Poster Session	
10:40-11:40		Collaborative Robots	Robot Programming		Business Track
11:40-12:20		Prof. Dr. Carme Torras Genís "Assistive Robotics: AI Challenges and Ethics Education based on Science Fiction"			
12:20-13:20	Lunch Break				
13:20-13:40		IERA Award Ceremony			
13:40-14:20		Dr. Andrew A. Goldenberg "Bridging Between AI and Robotics for Business and Product Development"			
14:20-15:20		Simulation and Workspace Planning	AI in Robotics - Methods		Business Track
15:20-15:40	Coffee Break & Networking			Poster Session	
15:40-16:40		AI in Robotics - Applications	Robotics in Production		
16:40-16:50		Best Paper Award			
16:50-17:00		Outlook for ISR 2021			

Wednesday, December 9

Wednesday, December 9 9:15 - 9:30

Welcome

Room 1

Chair: Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

Wednesday, December 9 9:30 - 10:10

Prof. Dr. Anna Valente "Autonomous Robots in Manufacturing: Challenges and Trends"

Room 1

Chair: Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

Wednesday, December 9 10:10 - 10:50

Prof. Dr. Alin Albu-Schäffer "Service Robotics: From Space to Industrial Manufacturing and Healthcare"

Room 1

Chair: Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

Wednesday, December 9 10:50 - 11:10

Coffee Break & Networking

Room: General

Poster Session

Room 3

10:50 Quasi-static loaded circular testing of serial articulated industrial manipulators

[Monica Gonzalez](#), [Arian Hosseini](#), [Nikolas Alexander Theissen](#) and [Andreas Archenti](#) (KTH Royal Institute of Technology, Sweden)

11:00 Communication-based Path Planning for Coordinated Planetary Surface Rovers

[Shreya Santra](#) (Tohoku University, Japan)

Wednesday, December 9 11:45 - 12:45

Lunch Break

Room: General

Wednesday, December 9 12:45 - 13:45

Industrial Robots

Room 1

12:45 Supervised Autonomous Interaction in Unknown Territories - Concept for Industrial Applications in the near Future

[Jonas Christoph Wittmann](#), [Jonis Kiesbye](#), [Daniel Rixen](#) and [Ulrich Walter](#) (Technical University of Munich, Germany)

13:05 Evaluation of path planning strategies in automated honeycomb potting

[Martin Harnisch](#) and [Johann Kipping](#) (Hamburg University of Technology, Germany); [Thorsten Schüppstuhl](#) (Technische Universität Hamburg-Harburg, Germany)

13:25 Operation and experimental evaluation of a 12-axis robot-based setup used for 3D-printing

[Zsolt Kállai](#) and [Maik Dammann](#) (Hamburg University of Technology, Germany); [Thorsten Schüppstuhl](#) (Technische Universität Hamburg-Harburg, Germany)

Mobile Robotics

Room 2

Chair: Birgit Graf (Fraunhofer IPA, Germany)

12:45 Traveling Drinksman

[Michele Persiani](#) (Umeå University, Sweden); [Cagatay Odabasi](#) and [Florenz Graf](#) (Fraunhofer IPA, Germany); [Mohit Kalra](#) (University of Stuttgart & Fraunhofer IPA, Germany); [Thomas Hellström](#) (Umeå University, Sweden); [Birgit Graf](#) (Fraunhofer IPA, Germany)

13:05 Robust and Precise Localization of Mobile Robots using EFIR Estimation for Fusing Odometry with Position Measurements

[Daniel Heß](#) (University of Applied Sciences and Arts, Dortmund, Germany); [Christof Röhrig](#) (University of Applied Sciences and Arts in Dortmund, Germany)

13:25 Dynamic Obstacle Layer: A new concept to avoid moving obstacles in local path planning using ROS

[Tonja Heinemann](#), [Moritz Villinger](#) and [Armin Lechler](#) (University of Stuttgart, Germany); [Alexander Verl](#) (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

Business Track

Room 4

Wednesday, December 9 13:45 - 14:25

Carl Doeksen "3M's Automation Journey: Driving Growth & Productivity for our customers"

Room 1

Chair: Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

Wednesday, December 9 14:25 - 14:45

Coffee Break & Networking

Room: General

Poster Session

Room 3

Robot programming system for human-robot cooperation and collaboration

[Julia Berg](#) (Fraunhofer IGCV, Germany); [Johannes Schilp](#) (University of Augsburg, Germany)

Multi-modal Visual Withdrawal Detection for Inventory Management on a Robotic Care Cart

[Jochen Lindermayr](#) and [Cagatay Odabasi](#) (Fraunhofer IPA, Germany); [Timur Alexander Wohlleber](#) (Universität Stuttgart, Germany); [Birgit Graf](#) (Fraunhofer IPA, Germany)

Wednesday, December 9 14:45 - 16:05

Components and Technologies

Room 1

14:45 A New Compliant Leg for the Humanoid Robot Forrest

[Hongxi Zhu](#) and [Ulrike Thomas](#) (Chemnitz University of Technology, Germany)

15:05 A New Low Cost Three-Finger Gripper with Hybrid Control for Soft Touch Behaviour

[Julian Bonse](#) and [Ulrike Thomas](#) (Chemnitz University of Technology, Germany)

15:25 Design of Compact Omnidirectional Wheel Modules with Internal Differential Kinematics

[Theo Jacobs](#) and [Erik Schäfer](#) (Fraunhofer IPA, Germany)

15:45 The multi-segment controller of a flexible arm

[Ryszard Leniowski](#) (Rzeszów University of Technology, Poland); [Lucyna Leniowska](#) (University of Rzeszow, Poland)

Wednesday, December 9 14:45 - 15:45

Business Track

Room 4

Wednesday, December 9 16:05 - 17:05

IERA Session

Room 1

Thursday, December 10

Thursday, December 10 9:00 - 10:20

Control

Room 1

9:00 *Automatic Synthesis of a Saturating State Space Controller Based on Convex Optimization for Industrial Robots*

[Lorenz Halt](#) (Fraunhofer IPA, Germany); [Andreas Pott](#) (University of Stuttgart, Germany)

9:20 *High Fidelity Real-Time Hybrid Substructure Testing Using Iterative Learning Control*

[Christina Insam](#), [Arian Kist](#) and [Daniel Rixen](#) (Technical University of Munich, Germany)

9:40 *Genetic Approach for Hardware-in-the-loop Optimization in a Multiple Degree-of-Freedom Coupled Dynamics System*

[Gustavo Jose Giardini Lahr](#), [Luiz Marão](#), [Henrique B Garcia](#), [Thiago Boaventura](#) and [Glauco Caurin](#) (University of São Paulo, Brazil)

10:00 *Evaluating the Robustness of HJB Optimal Feedback Control*

[Michael Lutter](#) (Technical University of Darmstadt, Germany); [Debora Clever](#) (ABB AG, Corporate Research, Germany); [Boris Belousov](#) (Technical University of Darmstadt, Germany); [Kim Listmann](#) (ABB Corporate Research Center Germany, Germany); [Jan Peters](#) (Technische Universität Darmstadt & Max-Planck Institute for Intelligent Systems, Germany)

Future of Work

Room 2

9:00 *PowerGrasp - Design and Evaluation of a Modular Soft-Robotic Arm Exosuit for Industrial Applications*

[Jean-Paul Goppold](#), [Jan Kuschan](#) and [Henning Schmidt](#) (Fraunhofer IPK, Germany); [Mirko Wolschke](#) and [Jana Liebach](#) (Reha-Zentrum Lübben, Germany); [Jörg Krüger](#) (Fraunhofer IPK, Germany); [Roman Hackbart](#) (Würth Electronics, Germany); [Jan Kostelnik](#) (Würth Elektronik GmbH, Germany); [Gregor Thiele](#) (Fraunhofer Gesellschaft, Germany)

9:20 *Dual arm robot control by hands gestures using ROS*

[Zoltán Forgó](#) (Sapientia University, Romania); [Miguel Angel Villanueva Portela](#) (Nation University of Colombia, Colombia); [Alfred Hypki](#) and [Bernd Kuhlentötter](#) (Ruhr-Universität Bochum, Lehrstuhl für Produktionssysteme (LPS), Germany)

9:40 *Finger Pointer Based Human Machine Interaction for Selected Quality Checks of Industrial Workpieces*

[Christian Bräuer-Burchardt](#), [Florian Siegmund](#), [Daniel Höhne](#) and [Peter Kühmstedt](#) (Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Germany); [Gunther Notni](#) (Fraunhofer Institut für Angewandte Optik und Feinwerktechnik, Germany)

10:00 *A Cooperative HCI Assembly Station with Dynamic Projections*

[Christian Lengenfelder](#), [Christian Frese](#), [Angelika Zube](#), [Michael Voit](#) and [Jürgen Beyerer](#) (Fraunhofer IOSB, Germany)

Thursday, December 10 10:20 - 10:40

Coffee Break & Networking

Room: General

Poster Session

Room 3

10:20 *Multitask Robot Framework Platform for Surgery*

[Paulo Henrique Polegato](#) (University of São Paulo - Brazil, Brazil); [Victor Daisuke Araki](#) (University of São Paulo, Brazil); [Renan Matsuda](#) (University of Sao Paulo, Brazil); [Oswaldo Baffa](#) (Universidade de Sao Paulo, Brazil); [Glauco Caurin](#) (University of São Paulo, Brazil)

10:30 Can knowledge-based offline-programming compensate for the lack of welding specialists?[Jobst Bickendorf](#) (Autocam Informationstechnik GmbH, Germany)**Thursday, December 10 10:40 - 11:40****Collaborative Robots**

Room 1

Chair: Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

10:40 Towards Collaborative Robots as Intelligent Co-workers in Human-Robot Joint Tasks: what to do and who does it?[Ana Isabel Barros Cunha](#) (University of Minho & Center for Computer Graphics, Portugal); [Flora Ferreira](#) (Center of Mathematics, University of Minho, Portugal); [Emanuel Sousa](#) (Center for Computer Graphics, University of Minho, Portugal); [Luís Louro](#), [Paulo Vicente](#), [Sérgio Monteiro](#), [Wolfram Erlhagen](#) and [Estela Bicho](#) (University of Minho, Portugal)**11:00 An Architecture for AR-based Human-Machine Interaction with Application to an Autonomous Mobile Robot Platform**[Alexander Atanasyan](#) (Institute for Man-Machine Interaction, RWTH Aachen University, Germany); [Juergen Rossmann](#) (Technical University of Aachen, Germany)**11:20 Development of devices applied to collaborative robot production system based on Collaborative Safety / Safety2.0**[Hidetoshi Fukui](#) (Manufacturer & IDEC Corporation, Japan); [Takayoshi Shimizu](#) and [Ikuo Maeda](#) (IDEC Corporation, Japan)**Robot Programming**

Room 2

Chair: Mihai Dragan (University of Stuttgart & ISW, Germany)

10:40 Using Task-Specific Workspace Maps to Plan and Execute Complex Robotic Tasks in a Flexible Multi-Robot Setup[Timo Jens Bachmann](#) (German Aerospace Center (DLR), Germany); [Korbinian Nottensteiner](#) (German Aerospace Center (DLR), Institute for Robotics and Mechatronics, Germany); [Ismael Rodriguez Brena](#) (Deutsches Zentrum für Luft- und Raumfahrt e. V., Germany); [Andreas Stemmer](#) and [Maximo Roa](#) (DLR, Germany)**11:00 Use CAD Data for Intuitive Definition of Robot Actions in a Skill-based Robot Application Development Environment**[Fan Dai](#) (ABB AG & Corporate Research, Germany); [Nuo Li](#) (ABB AG, Corporate Research Germany, Germany); [Debora Clever](#) (ABB AG, Corporate Research, Germany)**11:20 Robot Path Generation for Curve Manufacturing Processes from Unstructured CAD Data: An Off-line Programming Method**[Nikolaj W. Leth](#) and [Henrik Petersen](#) (University of Southern Denmark, Denmark)**Business Track**

Room 4

Thursday, December 10 11:40 - 12:20**Prof. Dr. Carme Torras Genís "Assistive Robotics: AI Challenges and Ethics Education based on Science Fiction"**

Room 1

Chair: Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

Thursday, December 10 12:20 - 13:20**Lunch Break**

Room: General

Thursday, December 10 13:20 - 13:40**IERA Award Ceremony**

Room 1

Thursday, December 10 13:40 - 14:20

Dr. Andrew A. Goldenberg "Bridging Between AI and Robotics for Business and Product Development"

Room 1

Chair: Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

Thursday, December 10 14:20 - 15:20

Simulation and Workspace Planning

Room 1

14:20 *Interactive Workspace Layout focusing on the Reconfiguration with Collaborative Robots in Modular Production Systems*

[Michael Wojtynek](#) (CoR-Lab & University Bielefeld, Germany); [Sebastian Wrede](#) (Bielefeld University, Germany)

14:40 *The Virtual Robotics Lab in education: Hands-on experiments with virtual robotic systems in the Industry 4.0 era*

[Michael Schluse](#) (Technical University of Aachen, Germany); [Marc Priggemeyer](#) (RWTH Aachen University, Germany); [Juergen Rossmann](#) (Technical University of Aachen, Germany)

15:00 *Virtual Commissioning with Mixed-Reality for Next-Generation Robot-Based Mechanical Component Testing*

[Michael Filipenko](#), [Alwin Hoffmann](#), [Alexander Poeppel](#), [Wolfgang Reif](#), [Andreas Monden](#) and [Markus Sause](#) (University of Augsburg, Germany)

AI in Robotics - Methods

Room 2

14:20 *UEM-CNN: Enhanced Stereo Matching for Unstructured Environments with Dataset Filtering and Novel Error Metrics*

[Nina Felicitas Heide](#) and [Samuel Gamer](#) (Fraunhofer IOSB, Germany); [Michael Heizmann](#) (Karlsruhe Institute of Technology, Germany)

14:40 *Model-Free Grasp Learning Framework based on Physical Simulation*

[Marc A Riedlinger](#) (University of Stuttgart, Germany); [Markus Völk](#), [Kilian Kleeberger](#), [Muhammad Usman Khalid](#) and [Richard Bormann](#) (Fraunhofer IPA, Germany)

15:00 *Spatial scene representation and navigation in a mobile robot using RGB-D camera*

[Marek Jaszuk](#) (University of Information Technology and Management in Rzeszow, Poland); [Wojciech Pałka](#) (Academic High School, Poland); [Michał Furgal](#) (University of Information Technology and Management in Rzeszow, Poland); [Dawid Darlak](#) (Academic High School, Poland); [Janusz Starzyk](#) (Ohio University, USA)

Business Track

Room 4

Thursday, December 10 15:20 - 15:40

Coffee Break & Networking

Room: General

Poster Session

Room 3

15:20 *A Pendulum Apparatus to Evaluate Unconstrained Human-Robot Contact*

[Harald Staab](#) (ABB AG, Germany); [Bjoern Matthias](#) (ABB AG Corporate Research, Germany); [Christoph Byner](#) (ABB AG, Germany); [Debora Clever](#) (ABB AG, Corporate Research, Germany)

15:30 *Structure of an Industry 4.0 Compliant Architecture Component for the Development of Simulation-based Control Applications in Cyber-Physical Systems*

[Marc Priggemeyer](#) (RWTH Aachen University, Germany); [Juergen Rossmann](#) (Technical University of Aachen, Germany)

Thursday, December 10 15:40 - 16:40

AI in Robotics - Applications

Room 1

15:40 *Automated Item Picking for fashion articles using Deep Learning*

[Moritz Weisenböhrer](#) and [Christian Wurl](#) (Karlsruhe University of Applied Sciences, Germany)

16:00 *Robot Learning - An Industrial Perspective on Challenges and Opportunities*

[Arne Wahrburg](#) (ABB AG Corporate Research, Germany); [Thomas Reisinger](#) (ABB Automation GmbH, Germany); [Rene Kirsten](#) (ABB AG, Corporate Research, Germany); [Kim Listmann](#) (ABB Future Labs Switzerland); [Nima Enayati](#) (ABB AG Corporate Research, Germany)

16:20 *Application of Ontologies for Semantic Scene Segmentation and Object Recognition*

[Pierre Venet](#) (Magazino GmbH, Germany); [Kirill Safronov](#) (KUKA Deutschland GmbH, Germany); [Aaronkumar Ehambram](#) and [Sven Wagner](#) (Leibniz Universität Hannover, Germany); [Jürgen Bock](#) (KUKA Deutschland GmbH, Germany); [Uwe Zimmermann](#) (KUKA Roboter GmbH, Germany)

Robotics in Production

Room 2

Chair: Rene Kirsten (ABB Automation GmbH, Germany)

15:40 *Towards Visual Referencing for Location Based Services in Industrial Settings*

[Daniel Schoepflin](#), [Michael Brand](#) and [Martin Gomse](#) (Hamburg University of Technology, Germany); [Thorsten Schüppstuhl](#) (Technische Universität Hamburg-Harburg, Germany)

16:00 *Methodology for choosing the best suitable strategy of robot trajectory adjustment*

[Matthias Neuhaus](#), [Sinje Kollan](#), [Jobst Bickendorf](#) and [Alina Müller](#) (TU Dortmund, Germany)

16:20 *Machine learning approaches for offline-programming optimization in robotic painting*

[Julian Ricardo Diaz Posada](#) (Dürr Systems AG, Germany); [Alexander Meißner](#) (Dürr Systems GmbH, Bietigheim-Bissingen, Germany); [Gauthier Hentz](#) and [Nikolai D'Agostino](#) (Employee, Germany)

Thursday, December 10 16:40 - 16:50

Best Paper Award

Room 1

Thursday, December 10 16:50 - 17:00

Outlook for ISR 2021

Room 1