Tuesday, June 21, 13:45 - 16:10

S1.1: Modeling

Room: Plenary
Chair: Christian Scheurer (KUKA Roboter GmbH, Germany)

13:45 *Sampling-based Path Planning to Cartesian Goal Positions for a Mobile Manipulator Exploiting Kinematic Redundancy*
Ruben Seyboldt, Christian Frese and Angelika Zube (Fraunhofer IOSB, Germany)
14:05 *Real Time Texture Generation in Optimized Large-Scale Polygon Meshes with KinectFusion*
Alexander Mock and Thomas Wiemann (Osnabrück University, Germany); Dorit Borrmann (Julius-Maximilians Universität Würzburg, Germany); Tristan Igelbrink (Osnabrück University, Germany); Joachim Hertzberg (Osnabrück University & DFKI Robotics Innovation Center, Osnabrück Branch, Germany)
14:25 *Experimental Robot Inverse Dynamics Identification Using Classical and Machine Learning Techniques*
Vinzenz Bargsten (University of Bremen & DFKI Bremen, Germany); José de Gea Fernández and Yohannes Kassahun (DFKI Bremen, Germany)
14:45 *The Advantages of Using Behavior Trees in Mult-Robot Systems*
Michele Colledanchise, Alejandro Marzinotto, Dimos Dimarogonas and Petter Ogren (KTH - The Royal Institute of Technology, Sweden)
15:05 *Automatic Testing Framework for Benchmarking Applications*
Florian Weisshardt (Fraunhofer IPA, Germany); Florian Köhler (Leibniz Universität Hannover, Germany)

S2.1: Components

Room 1
Chair: Ulrike Thomas (Chemnitz University of Technology, Germany)

13:45 *Active Ankle - an Almost-Spherical Parallel Mechanism*
Marc Simnofske (DFKI GmbH - Robotics Innovation Center, Germany); Shivesh Kumar (Deutsche Forschungszentrum für Künstliche Intelligenz GmbH, Germany); Bertold Bongardt (Deutsches Forschungszentrum für Künstliche Intelligenz (DFKI), Afghanistan); Frank Kirchner (German Research Center for Artificial Intelligence (DFKI) GmbH, Bremen, Germany)
14:05 *Optical Workspace Monitoring System for Safeguarding Tools on the Mobile Manipulator VALERI*
José Saenz (Fraunhofer IFF, Germany); Christian Vogel (Fraunhofer Institute for Factory Operation and Automation IFF, Germany)
14:25 *Tactile Sensors for Safety and Interaction with the Mobile Manipulator VALERI*
José Saenz and Markus Fritzsche (Fraunhofer IFF, Germany)
14:45 *Development of a Self-Adaptive Gripper and Implementation of a Gripping Reflex to Increase the Dynamic Payload Capacity*
Marc Manz (German Research Center for Artificial Intelligence (DFKI), Germany); Sebastian Bartsch (DFKI Bremen GmbH - Robotics Innovation Center, Germany); Marc Simnofske (DFKI GmbH - Robotics Innovation Center, Germany); Frank Kirchner (German Research Center for Artificial Intelligence (DFKI) GmbH, Bremen, Germany)
15:05 *An Optical Tactile Sensor for Measuring Force Values and Directions for Several Soft and Rigid Contacts*
Alexey Kolker (Novosibirsk State Technical University & Siberian Research Meteorological Institute, Russia); Michael Jokesch and Ulrike Thomas (Chemnitz University of Technology, Germany)

S3.1: Industrial Robots - Facts

Room 2
Chair: Jörg Franke (FAU Erlangen-Nuremberg, Germany)

13:45 *Do Robots Create Jobs? The Data Says Yes!*
Bob Doyle (Association for Advancing Automation, USA)
14:05 *Reduction of Heart Rate by Robot Trajectory Profiles in Cooperative HRI*
Barbara Kühnlenz (Coburg University of Applied Sciences and Arts, Germany); Kolja Kühnlenz (Coburg University of Applied Sciences and Arts & TU Munich, Germany)
14:25 *Attribute Enabled Programming of Industrial Robots*
Remus Boca (ABB Corporate Research Center, USA); Jianjun Wang (ABB Corporate Research, USA); Harald Staab (ABB Inc., USA); Gregory Rossano (ABB Inc., Corporate Research, USA); Thomas Fuhlbrigge (ABB Corporate Research Center, USA)
14:45 *Example Application of ISO/TS 15066 to a Collaborative Assembly Scenario*
Bjoern Matthias (ABB AG Corporate Research, Germany); Thomas Reisinger (ABB Automation GmbH, Germany)
15:05 *A Flexible Architecture for Automatically Generating Robot Applications based on Expert Knowledge*
Miroslav Macho, Ludwig Nägele, Alwin Hoffmann, Andreas Angerer and Wolfgang Reif (University of Augsburg, Germany)

Tuesday, June 21, 16:10 - 16:30

Poster Session and Coffee Break

Rooms: Galary/Restaurant, Plenary, Room 1, Room 2

Tuesday, June 21, 16:30 - 18:10

S1.2: Planning

Room: Plenary
Chair: Uwe Zimmermann (KUKA Roboter GmbH, Germany)

16:30 *Establishing Performance Guarantees for Behavior-Based Robot Missions Using an SMT Solver*
Feng Tang and Damian Lyons (Fordham University, USA); Ronald Arkin (Georgia Institute of Technology, USA)
16:50 *Industrial implementation of a multi-task redundancy resolution at velocity level for highly redundant mobile manipulators*
Christian Scheurer and Mario Fiore (KUKA Roboter GmbH, Germany); Shashank Sharma (Bonn Rhine Sieg University of Applied Sciences, Germany); Ciro Natale (Seconda Università degli Studi di Napoli, Italy)
17:10 *Data-Driven Human Grasp Movement Analysis*
Hamal Marino and Marco Gabiccini (University of Pisa, Italy); Ales Leonardis (The University of Birmingham, United Kingdom); Antonio Bicchi (University of Pisa, Italy)
17:30 *Distance Metrics for Path Planning with Dynamic Roadmaps*
Andreas Völz and Knut Graichen (Ulm University, Germany)

S2.2: Technologies

Room 1

Chair: Bernd Kuhlenkötter (Ruhr-Universität Bochum, Lehrstuhl für Produktionssysteme (LPS), Germany)

16:30 *Fast Edge-Based Detection and Localization of Transport Boxes and Pallets in RGB-D Images for Mobile Robot Bin Picking*
Dirk Holz and Sven Behnke (University of Bonn, Germany)
16:50 *May I be your Personal Coach? Bringing Together Person Tracking and Visual Re-identification on a Mobile Robot*
Tim Wengefeld, Markus Eisenbach, Thanh Trinh and Horst-Michael Gross (Ilmenau University of Technology, Germany)
17:10 *Texture Characterization with Semantic Attributes: Database and Algorithm*
Richard Bormann, Dominik Esslinger, Daniel Hundsdoerfer and Martin Hägele (Fraunhofer IPA, Germany); Markus Vincze (Vienna University of Technology, Austria)
17:30 *ENACT: An Efficient and Extensible Entity-Actor Framework for Modular Robotics Software Components*
Tobias Werner, Michael Gradmann, Eric Orendt, Maximilian Sand and Michael Spangenberg (Universität Bayreuth, Germany); Dominik Henrich (University of Bayreuth, Germany)
17:50 *Affordance Estimation For Vision-Based Object Replacement on a Humanoid Robot*
Wail Mustafa (University of Southern Denmark, Denmark); Mirko Wächter (Institute for Anthropomatics, Karlsruhe Institute of Technology, Germany); Sandor Szedmak (University of Innsbruck, Austria); Alejandro Agostini (University of Göttingen, Germany); Dirk Kraft (University of Southern Denmark, Denmark); Tamim Asfour (Karlsruhe Institute of Technology (KIT), Germany); Justus H. Piater (University of Innsbruck, Austria); Florentin Wörgötter (University of Goettingen, Germany); Norbert Krueger (University of Southern Denmark, Denmark)

S3.2: Industrial Robots - Technologies

Room 2
Chair: Heinz Wörn (Karlsruhe Institute of Technology (KIT), Germany)

16:30 *A Framework for Robot Control Software Development and Debugging Using a Real-Time Capable Physics Simulation*
Fabian Aichele, Björn Schenke, Bernd Eckstein and Albert Groz (TruPhysics GmbH, Germany)
16:50 *Modularization of skill ontologies for industrial robots*
Ludwig Jacobsson and Jacek Malec (Lund University, Sweden)
17:10 *User-Defined Transition between Path Segments in Terms of Tolerances in Speed and Position Deviationdefin*
Wolfgang Weber (University of Applied Sciences Darmstadt, Germany); Alexander König (University of Applied Sciences Darmstadt, Germany); Dany Xavier Nodem (University of Applied Sciences Darmstadt, Germany)
17:30 *Robot Assembly Skills based on Compliant Motion Control*
Fan Dai (ABB AG & Corporate Research, Germany); Arne Wahrburg, Bjoern Matthias and Hao Ding (ABB AG Corporate Research, Germany)
17:50 *Editing and synchronizing multi-robot playback programs*
Michael Riedl, Johannes Baumgartl and Dominik Henrich (University of Bayreuth, Germany)

Tuesday, June 21, 18:30 - 22:30

Conference Dinner

IERA and Engelberger Award Ceremony
Rooms: Galary/Restaurant, Plenary, Room 1, Room 2

Wednesday, June 22

Wednesday, June 22, 09:00 - 10:20

S1.3: Control

Room: Plenary

09:00 *From Virtual Testbeds to real lightweight robots: Development and deployment of control algorithms for soft robots, with particular reference to industrial peg-in-hole insertion tasks*
Georgij Grinshpun, Torben Cichon and Dipika Dipika (RWTH-Aachen University, Germany); Juergen Rossmann (Technical University of Aachen, Germany)
09:20 *Experimental verification of the advantages of a modular open chain metamorphic manipulator*
Charalampos Valsamos (University of Patras & Mechanical Eng. and Aeronautics Dpt., Greece); Vassilis Moulianitis (University of the Aegean, Greece); Nikos Aspragathos (University of Patras, Greece)
09:40 *Online Calibration of Industrial Robots using Inertial Sensors*
Hendrik Vieler (ISW - University of Stuttgart, Germany); Armin Lechler (University of Stuttgart, Germany); Jochen Grimm (ISW - University of Stuttgart, Germany)
10:00 *Practical trajectory designs for semi-automation of forestry cranes*
Szabolcs Fodor and Leonid Freidovich (Umeå University, Sweden); Carlos Vazquez (Ålö, Sweden)

Wednesday, June 22, 09:00 - 10:00

S4.1: Service Robot Technologies

Room 1
Chair: Tamim Asfour (Karlsruhe Institute of Technology (KIT), Germany)

09:00 *Energy-Aware Mobile Robot Exploration with Adaptive Decision Thresholds*
Micha Rappaport (University of Klagenfurt, Austria)
09:20 *Autonomous Surveying of Underfloor Voids*
Miguel Julia (Q-Bot Limited, United Kingdom); Mathew Holloway (Imperial College London, United Kingdom); Oscar Reinoso (Miguel Hernández University, Spain); Peter Childs (Imperial College London, United Kingdom)
09:40 *Design and implementation of a spherical joint for mobile*
Tim Fröhlich and Ulrich Reiser (Fraunhofer IPA, Germany)

Wednesday, June 22, 09:00 - 10:20

S3.3: Human-Robot Cooperation

Room 2
Chair: Martin Hägele (Fraunhofer IPA, Germany)

09:00 *New development for flexible robot supported quality investigations in the field of Human Robot Collaboration in automotive industries*
Sebastian Keller (BTU Cottbus - Senftenberg, Germany); Steffen Bindel and Alexander König (BMW Group, Germany)
09:20 *Sensor Glove for an Intuitive Human-Machine Interface for Exoskeletons as Manual Load Handling Assistance*
Patrick Stelzer, Werner Kraus and Andreas Pott (Fraunhofer IPA, Germany)

09:40 *Smart Workbench: Towards Optimal User Assistance in Industrial Human-Robot Applications*
Johannes Höcherl (Ostbayerische Technische Hochschule Regensburg, Germany); Thomas Schlegl (OTH Regensburg, Germany)
10:00 *Model Predictive Contact Control for Human-Robot Interaction*
Angelika Zube, Jonas Hofmann and Christian Frese (Fraunhofer IOSB, Germany)

Wednesday, June 22, 10:20 - 10:40

Poster Session and Coffee Break

Rooms: Galary/Restaurant, Plenary, Room 1, Room 2

Wednesday, June 22, 10:40 - 11:40

S4.2: Assistive Robots

Room: Plenary

10:40 *Control and Analysis of a Therapeutic Massage Robot: A Milestone of Human-Robot in Physical Contact*
Ren C. Luo, Chien-Wei Hsu and Shen-Yu Chen (National Taiwan University, Taiwan)
11:00 *A Sampling-Based Tree Planner for Navigation Among Movable Obstacles*
Elisa Tosello and Nicola Castaman (University of Padua, Italy); Enrico Pagello (University Padova, Italy)
11:20 *What Older Adults would Like a robot to Do in Their Homes - First results from a User Study in the Homes of Users*
Markus Vincze (Vienna University of Technology, Austria)

S4.3: Service Robot Applications

Room 1
Chair: Tamim Asfour (Karlsruhe Institute of Technology (KIT), Germany)

10:40 *Enabling Autonomous Locomotion into Sand - A Mobile and Modular Drilling Robot*
Felix Becker and Simon Börner (Technische Universität Ilmenau, Germany); Roy Lichtenheldt (German Aerospace Center (DLR) - Institute of System Dynamics and Control, Germany); Klaus Zimmermann (TU Ilmenau, Germany)
11:00 *A robot for spray applied insulation in underfloor voids*
Mathew Holloway (Imperial College London, United Kingdom); Miguel Julia (Q-Bot Limited, United Kingdom); Peter Childs (Imperial College London, United Kingdom)
11:20 *Automatic Tire Changing of Large Mining Vehicles with Industrial Robots*
Harald Staab (ABB Inc., USA); Remus Boca (ABB Corporate Research Center, USA); Carlos Martinez (ABB, USA); Gregory Rossano, Will Eakins and Dan Lasko (ABB Inc., Corporate Research, USA); Thomas Fuhlbrigge (ABB Corporate Research Center, USA)

S3.4: Control

Room 2

10:40 *Sensorless Null-Space Admittance Control for Redundant Manipulators*
Arne Wahrburg and Bjoern Matthias (ABB AG Corporate Research, Germany); Fan Dai (ABB AG & Corporate Research, Germany); Hao Ding (ABB AG Corporate Research, Germany); Johannes Bös (TU Darmstadt, Germany)

11:00 *A wireless haptic data suit for controlling humanoid robots*
Alessandro Graziano, Paolo Tripicchio, Emanuele Ruffaldi and Carlo Avizzano (Scuola Superiore Sant'Anna, Italy)
11:20 *Fault propagation and graph-based path generation for skill-based robot programming*
Christian Lehmann and Duc Tho Le (Brandenburg University of Technology, Germany)

Wednesday, June 22, 11:40 - 12:25

K3: Keynote: Peer Fischer

Room: Plenary

Wednesday, June 22, 12:25 - 13:45

Poster Session and Lunch

Rooms: Galary/Restaurant, Plenary, Room 1, Room 2

Wednesday, June 22, 13:45 - 14:30

K4: Keynote: Dario Floreano

Room: Plenary
Chair: Arturo Baroncelli (IFR, Italy)

Wednesday, June 22, 14:30 - 15:30

S3.5: Industrial Robots - Planning

Room: Plenary
Chair: Arturo Baroncelli (IFR, Italy)

14:30 *Planning and Execution of Collision-free Multi-robot Trajectories in Industrial Applications*
Andreas Angerer and Alwin Hoffmann (University of Augsburg, Germany); Lars-Christian Larsen and Michael Vistein (German Aerospace Center (DLR), Germany); Jonghwa Kim (University of Augsburg & Institut für Informatik, Germany); Michael Kupke (German Aerospace Center, Germany); Wolfgang Reif (University of Augsburg, Germany)
14:50 *Anytime Assembly Sequence Planning*
Robert Andre (Technische Universität Chemnitz, Germany); Ulrike Thomas (Chemnitz University of Technology, Germany)
15:10 *A Complete Automated Chain For Flexible Assembly using Recognition, Planning and Sensor-Based Execution*
Korbinian Nottensteiner (German Aerospace Center (DLR), Institute for Robotics and Mechatronics, Germany); Tim Bodenmüller, Michael Kassecker, Maximo Roa and Andreas Stemmer (DLR, Germany); Daniel Seidel (TU Munich, Germany); Ulrike Thomas (Chemnitz University of Technology, Germany)

S5: New Robotics Applications

Room 1

14:30 *Improved Ergonomics via an Intelligent Movement and Gesture Detection Jacket*
Jan Kuschan, Henning Schmidt and Jörg Krüger (Fraunhofer IPK, Germany)
14:50 *Development and Control of the Multi-Legged Robot MANTIS*

Sebastian Bartsch (DFKI Bremen GmbH - Robotics Innovation Center, Germany); Marc Manz (German Research Center for Artificial Intelligence (DFKI), Germany); Peter Kampmann (DFKI GmbH - Robotics Innovation Center, Germany); Hendrik Hanff (DFKI GmbH, Germany); Alexander Dettmann (DFKI GmbH - Robotics Innovation Center Bremen, Germany); Malte Langosz (DFKI GmbH, Germany); Kai von Szadkowski (University of Bremen, Germany); Jens Hilljegerdes and Marc Simnofske (DFKI GmbH - Robotics Innovation Center, Germany); Philipp Kloss (DFKI GmbH, Germany); Manuel Meder (University of Bremen, Germany); Frank Kirchner (German Research Center for Artificial Intelligence (DFKI) GmbH, Bremen, Germany)

15:10 *The Neurorobotic Platform: A simulation environment for brain-inspired robotics*
Florian Röhrbein (Technical University of Munich, Germany); Marc-Oliver Gewaltig (EPFL, Switzerland); Cecilia Laschi (SSSA, Italy); Gudrun J. Klinker (Technische Universitaet Muenchen, Germany); Paul Levi (FZI, Germany); Alois Knoll (Technical University Munich Garching, Germany)

S3.6: Industrial Robots: Vision, Environment

Room 2

14:30 *Camera-based Obstacle Classification for Automated Reach Trucks using Deep Learning*
Marian Himstedt (University of Lübeck, Germany); Erik Maehle (University of Lubeck, Germany)

14:50 *Using a Flexible Skill-Based Approach to Recognize Objects in Industrial Scenarios*
Rasmus Andersen, Casper Schou, Jens Damgaard and Ole Madsen (Aalborg University, Denmark)

15:10 *Real-time bearing fault probability estimation using onsite learning for industrial robots*
Joung Ji Hoon and Lim Hyunkyu (Hyundai Heavy Industries Co,. Ltd., Korea)

Wednesday, June 22, 15:30 - 15:50

Poster Session and Lunch

Rooms: Galary/Restaurant, Plenary, Room 1, Room 2

Fast and efficient traversable region extraction using quantized elevation map and 2D laser rangefinder
Lae-Kyoung Lee (Pohang University of Science and Technology (POSTECH), Korea)

Laser scanner detection and localization of successively arranged mobile robots
Rainer Halmheu (Technische Universität Dortmund & Audi AG Ingolstadt, Germany); Boris Otto (Technische Universität Dortmund, Germany); Thomas Pauleser (Audi AG Ingolstadt, Germany)

Analytic Forward and Inverse Kinematics of a Multi-Elastic-Link Robot Arm
Myrel Alsayegh and Freia Irina Mues (Technical University of Dortmund, Germany); Jörn Malzahn (Istituto Italiano Di Tecnologia (IIT), Italy); Torsten Bertram (Technische Universität Dortmund, Germany)

3D Scanning of Workpieces with Cooperative Industrial Robot Arms
Maximilian Wagner (Nuremberg Campus of Technology, Germany); Peter Heß (Technische Hochschule Nürnberg Georg Simon Ohm, Germany); Sebastian Reitelshöfer (Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany); Jörg Franke (FAU Erlangen-Nuremberg, Germany)

Visual/Tactile-based sensing strategy for grasping of planar non-rigid objects
Pablo Gil, Carlos Mateo, Angel Delgado and Fernando Torres (University of Alicante, Spain)

Development of an intelligent care cart and new supply concepts for care homes and hospitals

Birgit Graf (Fraunhofer IPA, Germany); Ralf Simon King (Universität Stuttgart, ISW, Germany); Christian Schiller and Andrea Rößner (Universität Stuttgart, IAT, Germany)

Test concept for a mobile robot with optimized traction

Ludwig Barthuber, Peter Firsching and Klajdo Fyraj (Deggendorf Institute of Technology, Germany)

Energy Efficient Kinodynamic Motion Planning for Holonomic AGVs in Industrial Applications using State Lattices

Frank Künemund (University of Applied Sciences and Arts Dortmund, Germany); Daniel Heß (University of Applied Sciences and Arts, Dortmund, Germany); Christof Röhrig (University of Applied Sciences and Arts in Dortmund, Germany)

A proposal of extracting of motion primitives by analyzing tracked data of hand motion from human demonstration

Ngoc Hung Pham and Takashi Yoshimi (Shibaura Institute of Technology, Japan)

A New Multi-Modal Approach Towards Reliable Bin-Picking Application

Veit Müller (Fraunhofer Institute for Factory Operation and Automation IFF, Germany); Roland Behrens (Fraunhofer Institute for Factory Operation and Automation (IFF), Germany); Norbert Elkmann (Fraunhofer IFF, Germany)

Simultaneous Calibration of Odometry and external Sensors of Omnidirectional Automated Guided Vehicles (AGVs)

Daniel Heß (University of Applied Sciences and Arts, Dortmund, Germany); Frank Künemund (University of Applied Sciences and Arts Dortmund, Germany); Christof Röhrig (University of Applied Sciences and Arts in Dortmund, Germany)

Influence of Grasping Position to Robot Assembling Task

Akira Suyama and Yasumichi Aiyama (University of Tsukuba, Japan)

A Virtual Space Robotics Testbed for Optical Sensors in Aerospace

Thomas Steil, Marc Priggemeyer and Markus Emde (RWTH Aachen University, Germany); Juergen Rossmann (Technical University of Aachen, Germany); Georgij Grinshpun (RWTH-Aachen University, Germany)

Folding mechanism for a remotely deployable robotic vehicle

Mathew Holloway (Imperial College London, United Kingdom); Miguel Julia (Q-Bot Limited, United Kingdom); Peter Childs (Imperial College London, United Kingdom)

Context-aware Planning by Refinement for Personal Robots in Smart Homes

Nathan Ramoly and Bouzeghoub Amel (Télécom SudParis, France); Beatrice Finance (University of Versailles, France)

Dynamic modeling of new modular manipulators

Zoltán Forgó (Sapientia University, Romania)

On Cognitive Robot Wood Working in SMERobotics

Mathias Haage (Lund University & Cognibotics, Sweden)

Learning and executing rhythmic movements through chaotic neural networks: a new method for walking humanoid robots

Giuseppina C Gini, Matteo Bana and Alessio Franchi (Politecnico di Milano, Italy); Michele Folgheraiter and Amina Keldibek (Nazarbayev University, Kazakhstan)

Asymptotic optimal trajectory planning under consideration of kinematic and direction constraints for mobile car-like robots

Tobias Lindeholz (Zentrum für Telematik, Germany); Robin Hess (Universität Würzburg, Germany); Daniel Eck and Klaus Schilling (University of Würzburg, Germany)

KaCanOpen: An Open Plug&Play CANopen Stack for ROS in Modern C++

Thomas Keh, Andreas Bihlmaier, Julien Mintenbeck and Heinz Wörn (Karlsruhe Institute of Technology (KIT), Germany)

Human Push-Recovery: Strategy Selection Based on Push Intensity Estimation

Lukas Kaul (Karlsruhe Institute of Technology & Institute for Anthropomatics and Robotics, Germany); Tamim Asfour (Karlsruhe Institute of Technology (KIT), Germany)

Implementation of a safe hybrid workplace for robot-assisted riveting

Ramez Awad and Manuel Fechter (Fraunhofer IPA, Germany)

7DoF Hand and Arm Tracking for Teleoperation of Anthropomorphic Robots

Jan Graßhoff, Lasse Hansen and Ivo Kuhlemann (Universität zu Lübeck, Germany); Kristian Ehlers (Universität zu Lübeck)

Semantic Translation Tool for Robotics Applications
Pablo Quilez (Fraunhofer IPA, Germany)

Novel Intelligent Technologies for Industrial Robot in Manufacturing - Architectures and Applications
Haruhisa Okuda (Mitsubishi Electric Corporation, Japan)

Two Autonomous Robots for the DLR SpaceBot Cup - Lessons Learned from 60 Minutes on the Moon
Sven Lange and Daniel Wunschel (Chemnitz University of Technology, Germany); Stefan Schubert, Tim Pfeifer, Peter Weissig, Andreas Uhlig and Martina Truschzinski (TU Chemnitz, Germany); Peter Protzel (Technische Universität Chemnitz, Germany)

Ultra-Flexible Production Systems for Automated Factories
Remus Boca (ABB Corporate Research Center, USA); Harald Staab (ABB Inc., USA); George Zhang (ABB & Corporate Research Center, USA); Sang Choi (ABB, Inc. & US Corporate Research Center, USA); Carlos Martinez (ABB, USA); Thomas Fuhlbrigge (ABB Corporate Research Center, USA); Will Eakins and Gregory Rossano (ABB Inc., Corporate Research, USA); Srinivas Nidamarthi (ABB Inc, USA)

Mechatronics Practice in Education Step by Step, Workshop on Mobile Robotics
Anton Yudin (Bauman Moscow State Technical University); Maria Salmina (Lomonosov Moscow State University, Russia); Vladimir Sukhotskiy (State Budget Vocational and Educational Institution Vorobyovi Gori, Russia); Jean-Daniel Dessimoz (Western Switzerland University of Applied Sciences and Arts & HESSO, HEIG-VD, Switzerland)

Relative Motion Estimation Based on Sensor Eigenfusion Using a Stereoscopic Vision System and Adaptive Statistical Filtering
Gennaro Notomista (Istituto Italiano di Tecnologia, Italy); Alexander Kammenhuber (AUDI AG, Germany); Parthasarathy Nadarajan and Michael Botsch (Technische Hochschule Ingolstadt, Germany); Mario Selvaggio (Istituto Italiano di Tecnologia, Italy)

Advanced safety solutions for human-robot-cooperation
Timo Salmi (VTT, Technical Research Center of Finland, Finland)

AnyWalker: all-terrain robotic chassis
Igor Ryadchikov (Kuban State University, Russia), Semyon Sechenev (Kuban State University, Russia), Alexander Svidlov (Kuban State University, Russia), Sergey Sinitsa (Kuban State University, Russia), Zurab Buskandze (Kuban State University) and Evgeny Nikulchev (Moscow Technological Institute, Russia)

Wednesday, June 22, 15:50 - 17:10

S3.7: Industrial Robots - Coating, Painting, Welding

Room: Plenary
Chair: Arturo Baroncelli (IFR, Italy)

15:50 *Automated spray coating of complex 2.5D workpieces in small batch sizes with complex geometries in throughput by an innovative machine combination*
Denise Klose and Thorsten Schüppstuhl (Technische Universität Hamburg-Harburg, Germany); Dominik Osthues (Venjakob Maschinenbau GmbH & Co. KG, Germany)

16:10 *Automatic Gyro Effect Simulation for Robotic Painting Application*
Xiongzi Li (ABB Robotics, USA)

16:30 *Detection of Assembly Variations for Automatic Program Adaptation in Robotic Welding Systems*
Alexander Kuss and Ulrich Schneider (Fraunhofer IPA, Germany); Thomas Dietz (Fraunhofer Institute for Manufacturing Engineering and Automation (IPA), Germany); Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)

16:50 *New Applications of Cutting and Welding Robots with Automatic Offline-Programming*
Jobst Bickendorf (Autocam Informationstechnik GmbH, Germany)

S3.8: Industrial Robots: Assembly, Manufacturing

Room 1
Chair: Bjoern Matthias (ABB AG Corporate Research, Germany)

15:50 *Teaching door assembly tasks in uncertain environment*
Stefano Michieletto and Francesca Stival (University of Padova, Italy); Enrico Pagello (University Padova, Italy)
16:10 *A variant-flexible assembly cell for hydraulic valve sections using a sensitive lightweight robot*
Christian Lehmann (Brandenburg University of Technology, Germany); Jost Philipp Städter (Brandenburg University of Technology Cottbus - Senftenberg, Germany); Kornelius Wächter (Brandenburg University of Technology, Germany)
16:30 *Analysis and Development of the Fused Layer Manufacturing Process using Industrial Robots*
Michael Rieger (Ruhr-Universität Bochum & Lehrstuhl für Produktionssyssteme, Germany); Benjamin Johnen (Ruhr-Universität Bochum, Germany); Bernd Kuhlenkötter (Ruhr-Universität Bochum, Lehrstuhl für Produktionssysteme (LPS), Germany)
16:50 *Repair of Composite Structures with a Novel Human-Machine System*
Rebecca Rodeck and Thorsten Schüppstuhl (Technische Universität Hamburg-Harburg, Germany)

S3.9: Industrial Robots: Handling, Forming, Processing

Room 2
Chair: Christian Schlosser (TU-Hamburg-Harburg, Germany)

15:50 *Machine Learning In Incremental Sheet Metal Forming*
Denis D. Störkle, Patrick Seim and Lars Thyssen (Ruhr Universität Bochum, Germany); Bernd Kuhlenkötter (Ruhr-Universität Bochum, Lehrstuhl für Produktionssysteme (LPS), Germany)
16:10 *Robot based automation of artistic stone surface production*
Gregor Steinhagen (TU Dortmund, Institute of Production Systems); Johannes Braumann (Association for Robots in Architecture | University for Arts and Design Linz, Austria); Carsten Krewet (TU Dortmund University, Institute of Production Systems, Germany); Jan Brüninghaus and Sigrid Brell-Cokcan (RWTH Aachen University, Chair of Individualized Building Production, Germany); Bernd Kuhlenkötter (Ruhr-Universität Bochum, Lehrstuhl für Produktionssysteme (LPS), Germany)
16:30 *Mixed Case Palletizing with Industrial Robots*
Christian Wurll (Swisslog Automation GmbH, Germany)
16:50 *Automatic programming and control for robotic deburring*
Julian Ricardo Diaz Posada, Shivaram Kumar, Alexander Kuss, Ulrich Schneider and Manuel Drust (Fraunhofer IPA, Germany); Thomas Dietz (Fraunhofer Institute for Manufacturing Engineering and Automation (IPA), Germany); Alexander Verl (Stuttgart University, Institute for Control Engineering of Machine Tools, Germany)