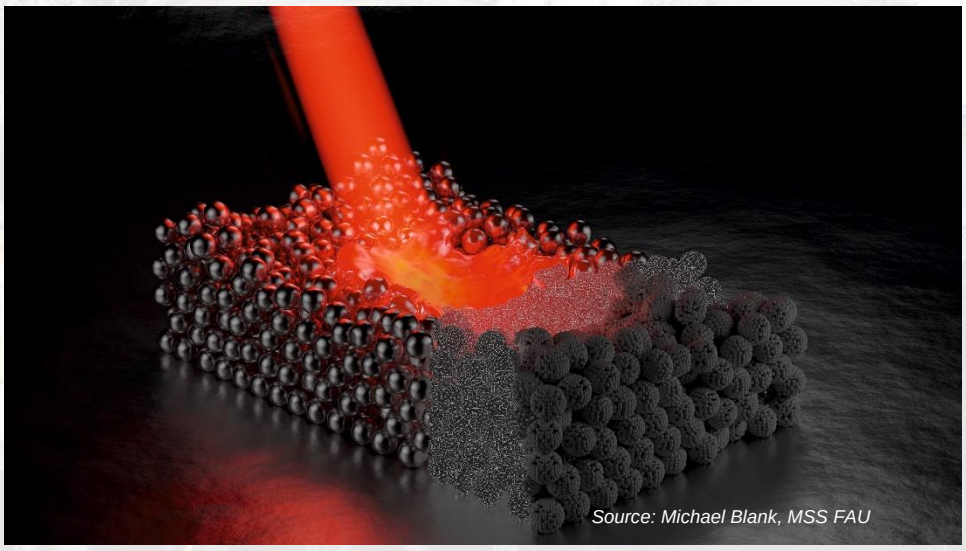
EMPOrIA 2023

Enhanced Material and Part Optimization and Process Intensification

16 – 17th May 2023

SuperC

International Joint Conference



Enhanced Material and Part Optimization and Process Intensification – EMPOrIA is an International Joint Conference organized by the entities SFB1120 of RWTH Aachen University, SFB814 of University of Erlangen-Nurnberg and CCE of TU Darmstadt.

EMPOrIA is the perfect platform for efficient knowledge transfer in the field of materials processing and their applications.

The conference is devoted to scientific presentations on the latest research results. Following the common code of good scientific practice, the presentations shall be complete, comprehensible, and verifiable.

EMPOrIA is focusing on the latest developments as well as future trends in the field of materials processing. The conference topics address anyone who is interested in the potential of manufacturing in theory and application.

It is the aim of EMPOrIA to bring together international experts from research and industry to match scientific advances and economic needs for mutual benefit.

We invite you to join the EMPOrIA and be a part of our international community sharing ideas in inspiring talks and discussions.

Aachen/Darmstadt/Erlangen, May 2023

TUESDAY, 16TH MAY 2023

8:00	**REGISTRATION AT THE LOBBY (SUPER C)**	
	OPENING CHAIR: UWE REISGEN	
	FORD – SAAL	
09:00	Welcome speech by Prof. Reisgen	
09:20	Introduction of CRC 1120 by Prof. Gillner	
09:40	Introduction of CRC 814 by Prof. Drummer	
10:00	Introduction of CCE by Dr. Marschall	
10:20	**Coffee break**	
	SESSION 1A: ADDITIVE MANUFACTURING I CHAIR: MICHAEL SCHMIDT	SESSION 1B: INJECTION MOULDING AND LASER CUTTING CHAIR: CHRISTIAN HOPMANN
	FORD – SAAL	GENERALI – SAAL
10:40	Keynote Speaker 1 **"Laser powder bed fusion: what we have achieved in 25 years"** Wilhelm Meiners *Trumpf Laser- und Systemtechnik SE & Co KG, Germany*	
11:10	**Innovative process strategies in multi-material additive manufacturing** Robert Setter[1,5], Jan Hafenecker[2,5], Richard Rothfelder[3,5], Sebastian-Paul Kopp[4,5], Stephan Roth[4,5], Michael Schmidt[3,5], Marion Merklein[2,5], Katrin Wudy[1,5] *1: Department of Mechanical Engineering, Technical University of Munich; 2: Institute of Manufacturing Technology, Friedrich-Alexander-Universität Erlangen-Nürnberg; 3: Institute of Photonic Technologies, Friedrich-Alexander-Universität Erlangen-Nürnberg; 4: Bavarian Laser Center GmbH; 5: Collaborative Research Center 814 – Additive Manufacturing, Germany*	**Adaptation of the non-isothermal crystallisation kinetics model to predict crystallisation processes in injection moulding processes** Jonathan Alms[1], Blanca Ferrer Fabon[2], Christian Hopmann[1], Marek Behr[2] *1: RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft; 2: RWTH Aachen University, Chair for Computational Analysis of Technical Systems (CATS), Germany*
11:30	**Influence of scanning strategy on grain structure of CMSX-4 in tilted struts processed by electron beam powder bed fusion** Zerong Yang, Johannes Köpf, Matthias Markl, Carolin Körner *Chair of Materials Science and Engineering for Metals, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*	**A complete formulation for high-resolution injection molding simulations for semi-crystalline polymers** Blanca Ferrer Fabón[1], Jonathan Alms[2], Cemi Kahve[2], Marek Behr[1], Christian Hopmann[2] *1: RWTH Aachen University, Chair for Computational Analysis of Technical Systems (CATS); 2: RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft*
11:50	**Effect of the thermal process conditions on the resulting microstructural and mechanical properties of bulk stainless steel 316L parts produced by Laser Metal Deposition with coaxial wire feeding** Christian Bernauer, Thomas Merk, Avelino Zapata, Michael F. Zaeh *Technical University of Munich, Institute for Machine Tools and Industrial Management, Germany*	**Evaluation of a self-optimising local mould temperature control for inline warpage reduction of injection moulded parts** Christian Hopmann, Cemi Emre Kahve, Daniel Colin Fritsche, Jan Fellerhoff *RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft*
12:10	**A-priori layer height determination in WAAM processes based on path planning and weld geometry** Konrad Mäde, Paul Johannes Kellerwessel, Rahul Sharma, Uwe Reisgen *RWTH Aachen University, Welding and Joining Institute*	**Analysis of response signals to modulation approaches in laser cutting** Marcelo de Oliveira Lopes[1], Dirk Petring[2], Michael Sawannia[3], Frank Schneider[2], Marc Hummel[1], Alexander Olowinsky[2], Felix Beckmann[4], Julian Moosmann[4], Arnold Gillner[1,2] *1: RWTH Aachen – Lehrstuhl für Laserstechnik, Aachen; 2: ILT – Fraunhofer-Institut für Lasertechnik, Aachen; 3: IFSW – Institut für Strahlwerkzeuge, Stuttgart; 4: Institute of Materials Physics, Helmholtz-Zentrum Hereon, Geesthacht*
12:30	**Lunch time**	

TUESDAY, 16TH MAY 2023

	SESSION 2A: SIMULATION AND OPTIMIZATION TECHNIQUE I CHAIR: OLEG MOKROV	SESSION 2B: WELDING I CHAIR: ARNOLD GILLNER
	FORD – SAAL	GENERALI – SAAL
13:30	Keynote Speaker 2 **"Simulating Process-Structure-Property Relationships in Powder Bed Fusion"** Philip Cardiff *University College Dublin, Ireland*	
14:00	**Ray-tracing method with implicit surface detection for SPH-based laser welding simulation** Lukas Westhofen[1], Jan Kruska[2], Jan Bender[1], Sergej Warkentin[2], Oleg Mokrov[2], Rahul Sharma[2], Uwe Reisgen[2] *1: RWTH Aachen University, Visual Computing Institute; 2: RWTH Aachen University, Welding and Joining Institute*	**Investigation of keyhole dynamics in laser welding of copper with dynamic beam shaping via high-speed synchrotron X-ray imaging and multiphysical process simulation** Tobias Florian[1], Klaus Schricker[2], Constantin Zenz[1], Andreas Otto[1], Leander Schmidt[2], Hannes Friedmann[2], Christian Diegel[2], Marc Seibold[2], Peter Hellwig[2], Fabian Fröhlich[2], Falk Nagel[3], Peter Kallage[3], Michele Buttazzoni[1], Alexander Rack[4], Herwig Requardt[4], Yunhui Chen[4,5,6] *1: TU Wien, Institute of Production Engineering and Photonic Technologies, Austria; 2: TU Ilmenau, Production Technology Group, Germany; 3: COHERENT, Germany; 4: ESRF - The European Synchrotron, Grenoble, France; 5: The University of Manchester, Department of Materials, Manchester, Great Britain; 6: RMIT University, School of Engineering, Australia*
14:20	**Simulation of wire metal transfer in the Cold Metal Transfer (CMT) variant of GMA welding using the Smoothed Particle Hydrodynamics (SPH) approach** Oleg Mokrov[1], Sergej Warkentin[1], Lukas Westhofen[2], Jan Bender[2], Rahul Sharma[1], Uwe Reisgen[1] *1: RWTH Aachen University, Welding and Joining Institute; 2: RWTH Aachen University, Visual Computing Institute - Computer Animation*	**Influence of beam shape on melt pool geometry and surface roughness for heat conduction welding of EN AW-5083** Florian Nahr[1,2,3,4], Michael Schmidt[1,2,3,4] *1: Friedrich-Alexander-Universität Erlangen-Nürnberg; 2: Institute of Photonic Technologies (LPT), Friedrich-Alexander-Universität Erlangen-Nürnberg; 3: Collaborative Research Center 814 – Additive Manufacturing; 4: Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany*
14:40	**Lattice Structure Optimization in Additive Manufacturing using Numerical Homogenization based on Beam Models** Daniel Hübner[1], Ludwig Herrnböck[2], Julia Mergheim[2], Fabian Wein[1], Paul Steinmann[2], Michael Stingl[1] *1: Department of Mathematics, Friedrich-Alexander University Erlangen-Nuremberg; 2: Institute of Applied Mechanics, Friedrich-Alexander University Erlangen-Nuremberg*	**Controlling the weld penetration depth of laser beam micro welding by using an iterative learning approach** Christoph Spurk[1], Sören Hollatz[2], Wiktor Lipnicki[1], Marc Hummel[1], Arnold Gillner[1,2], Constantin Häfner[1,2] *1: RWTH Aachen University, Chair for Laser Technology LLT; 2: Fraunhofer Institute for Laser Technology ILT, Germany*
15:00	**Influence of Cooling Path on Solidification Morphology and Hot Tearing Susceptibility of an Al-Cu-Fe-Mg-Si Alloy** Bei Zhou[1], Markus Apel[1], Janin Eiken[1], Shrujal Gor[2], Nino Wolff[2] *1: Access e. V., Germany; 2: RWTH Aachen University, Foundry Institute*	**Influence of laser beam welding in vacuum on the magnetic properties of non-grain oriented electrical steel sheets** Thomas Krichel, Simon Olschok, Uwe Reisgen *RWTH Aachen University, Welding and Joining Institute, Germany*
15:20	**Coffee break**	

TUESDAY, 16TH MAY 2023

	SESSION 3A: ADDITIVE MANUFACTURING II CHAIR: CAROLIN KÖRNER	SESSION 3B: SIMULATION AND OPTIMIZATION TECHNIQUE II CHAIR: MAREK BEHR
	FORD – SAAL	GENERALI – SAAL
15:40	Keynote Speaker 3 **"Title"** Maximilian Binder *BMW AG, Germany*	
16:10	**Investigation of the shape and detectability of pores with the x-ray computed tomography** Benjamin Baumgärtner[1,2,3], Juan Hussein[1,3], Tino Hausotte[1,2,3] *1: Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); 2: Collaborative Research Center 814 – Additive Manufacturing (CRC 814); 3: Institute of Manufacturing Metrology, Germany*	**Simulation based distortion management for multiple stage assembly of welded structures** Dr.-Ing. Tobias Loose *Dr. Loose GmbH*
16:30	**A Ray Tracing Model for Electron Optical Imaging in Electron Beam Powder Bed Fusion** Jakob Renner, Matthias Markl, Carolin Körner *Lehrstuhl für Werkstoffkunde und Technologie der Metalle, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany*	**Modeling of arcs with binary gas mixtures in a multi-arc plasma generator** Kirsten Bobzin[1], Hendrik Heinemann[1], Marvin Erck[1], Sergej Warkentin[2], Oleg Mokrov[2], Rahul Sharma[2], Uwe Reisgen[2], Kevin Jasutyn[1] *1: RWTH Aachen University, Surface Engineering Institute (IOT); 2: RWTH Aachen University, Welding and Joining Institute (ISF), Germany*
16:50	**Influence of the viscoelastic stresses on the deposition flow in material extrusion additive manufacturing** Marcin Serdeczny *Flow Science Inc., United States of America*	**Methodology of a thermal injection mould design with locally applied heater coatings on the cavity wall** Daniel Colin Fritsche[1], Cemi Emre Kahve[1], Christian Hopmann[1], Kirsten Bobzin[2], Hendrik Heinemann[2], Marvin Erck[2], Carsten Vogels[2] *1: RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft; 2: RWTH Aachen University, Surface Engineering Institute (IOT), Germany*
17:10	**Geometrical influence on material properties for Ti6Al4V parts in powder bed fusion** Florian Nahr[1,2,3,7], Michael Rasch[1,2,3,7], Jakob Renner[1,2,4], Benjamin Baumgärtner[1,2,5], Christian Burkhardt[1,2,6], Julia Mergheim[1,2,6], Paul Steinmann[1,2,6], Tino Hausotte[1,2,5], Carolin Körner[1,2,4], Michael Schmidt[1,2,3,7], Matthias Markl[1,2,4] *1: Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; 2: Collaborative Research Center 814 – Additive Manufacturing (CRC 814); 3: Institute of Photonic Technologies (LPT); 4: Chair of Materials Science and Engineering for Metals; 5: Institute of Manufacturing Metrology; 6: Institute of Applied Mechanics; 7: Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany*	**Application of Smoothed Particle Hydrodynamics (SPH) method for weld formation simulation in GMA welding of complex topologies** Oleg Mokrov[1], Sergej Warkentin[1], Lukas Westhofen[2], Stefan Rhys Jeske[2], Jan Bender[2], Rahul Sharma[1], Uwe Reisgen[1] *1: RWTH Aachen University, Welding and Joining Institute; 2: RWTH Aachen University, Visual Computing Institute - Computer Animation*
17:30	**Understanding inhomogeneous mechanical properties in LPBF manufactured parts due to inhomogeneous macro temperature profiles based on process-inherent preheating** Jonas Zielinski[1], Jan Theunissen[1], Johannes Henrich Schleifenbaum[1], Mustafa Megahed[2], Silja-Katharina Rittinghaus[3], Zhu Dongjian[4], Henrik Kruse[1] *1: RWTH Aachen University, Digital Additive Production; 2: ESI Group; 3: Bergische Universität Wuppertal; 4: GKN Sinter Metals*	**Applying Gaussian Process Regression to Injection Molding** Steffen Tillmann[1], Marek Behr[1], Stefanie Elgeti[1,2] *1: RWTH Aachen University, Chair for Computational Analysis of Technical Systems; 2: TU Wien, Institute of Lightweight Design and Structural Biomechanics*
19:00	**Dinner (Forum M)**	

WEDNESDAY, 17TH MAY 2023

08:00	Meeting Point Super C	
	SESSION 4A: ADDITIVE MANUFACTURING III **CHAIR: DIETMAR DRUMMER**	**SESSION 4B: BMWK PROJECT HL BLECH** **CHAIR: SIMON OLSCHOK**
	FORD – SAAL	GENERALI – SAAL
08:30	Keynote Speaker 4 **Sustainability In Additive Manufacturing: A Broad Perspective** David Bourell *The University of Texas at Austin, United States of America*	
09:00	**Thin-walled part properties in powder bed fusion of polymers – a comparative study on temperature development and part performance depending on part thickness and orientation** Andreas Jaksch[1,2], Simon Cholewa[1,2], Dietmar Drummer[1,2] *1: Collaborative Research Center - Additive Manufacturing (CRC 814), Friedrich-Alexander-Universität Erlangen-Nürnberg; 2: Friedrich-Alexander-Universität Erlangen-Nürnberg, Institute of Polymer Technology, Germany*	**Development of heavy plates for electron beam welding of monopiles for the construction of offshore wind energy plants** Sebastian Scholl, Jürgen Schütz, Sébastien Lenhard, Tobias Lehnert, Thorsten Staudt, Wolfgang Schütz *AG der Dillinger Hüttenwerke, Germany*
09:20	**Comparative study on polybutylene terephthalate for laser bed fusion of polymers: polymer precipitation, powder characterisation, processability and component properties** Florentin Tischer[1], Simon Cholewa[2], Dietmar Drummer[2], Wolfgang Peukert[1], Jochen Schmidt[1] *1: Institute of Particle Technology (LFG), Friedrich-Alexander-Universität Erlangen-Nürnberg; 2: Lehrstuhl für Kunststofftechnik (LKT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*	**Development of a robust welding process for electron beam welding of thick plates for construction of offshore wind turbines** Uwe Reisgen, Simon Olschok, Timm Evers *RWTH Aachen University, Welding and Joining Institute, Germany*
9:40	**Thermal Intra-Layer Interaction of Discretized Fractal Exposure Strategies in Non-Isothermal Laser-Based Powder Bed Fusion of Polypropylene** Samuel Schlicht[1,2], Dietmar Drummer[1,2] *1: Institute of Polymer Technology, Friedrich-Alexander-Universität Erlangen-Nürnberg; 2: Collaborative Research Center 814, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*	**Microstructural Investigation of electron beam welds for a low-alloy steel** Adrian Herges[1], Christoph Pauly[1], Martin Müller[1], Dominik Britz[1], Sebastian Scholl[2], Frank Mücklich[1] *1: Lehrstuhl für Funktionswerkstoffe, Universität des Saarlandes; 2: AG der Dillinger Hüttenwerke, Germany*
10:00	**Evaluation of additively manufactured internal geometrical feature using the x-ray computed tomography** Benjamin Baumgärtner[1,2,3], Richard Rothfelder[1,2,4,7], Sandra Greiner[1,2,5], Christoph Breuning[1,2,6], Jakob Renner[1,2,6], Michael Schmidt[1,2,4], Dietmar Drummer[1,2,5], Caroline Körner[1,2,6], Tino Hausotte[1,2,3], Matthias Markl[1,2,6] *1: Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); 2: Collaborative Research Center 814 – Additive Manufacturing (CRC 814); 3: Institute of Manufacturing Metrology; 4: Institute of Photonic Technologies (LPT); 5: Institute of Polymer Technology (LKT); 6: Chair of Materials Science and Engineering for Metals; 7: Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany*	**Local characterization of quasi-static failure and the fatigue crack growth behaviour of welded steel microstructures using novel experimental methods** Jutta Luksch[1], Marc C. Thiel[1], Adrian Herges[2], Florian Schäfer[1], Sebastian Scholl[3], Frank Mücklich[2], Christian Motz[1] *1: Materials Science and Methods, Saarland University; 2: Functional Materials Department, Saarland University; 3: Aktien-Gesellschaft der Dillinger Hüttenwerke, Germany*
10:20	**Coffee break**	

WEDNESDAY, 17TH MAY 2023

	SESSION 5A: COATING; BRAZING; CASTING CHAIR: MARKUS APEL	SESSION 5B: WELDING II CHAIR: UWE REISGEN
	FORD – SAAL	GENERALI – SAAL
10:40	Keynote Speaker 5 **Tailoring of workpiece geometry and coating microstructure in laser cladding processes** Andreas Wank *GTV Verschleißschutz GmbH, Germany*	
11:10	**Influence of the Spray Angle on Thermally Sprayed Heating Coatings** Kirsten Bobzin[1], Hendrik Heinemann[1], Marvin Erck[1], Andreas Schacht[1], Christian Hopmann[2], Daniel Fritsche[2], Cemi Kahve[2], Carsten Vogels[1] *1: RWTH Aachen University, Surface Engineering Institute (IOT), Germany; 2: RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft*	**Fatigue strength of friction welds under consideration of residual stresses** Lorenz Uhlenberg[1], Jörg Baumgartner[2], Christoph Rößler[3], Markus Köhler[1], Frank Trommer[4], Klaus Dilger[1] *1: Institute of Joining and Welding, Technische Universität Braunschweig; 2: Fraunhofer LBF; 3: Sampro GmbH; 4: Institute of Mechanical Engineering, Hochschule Magdeburg-Stendal, Germany*
11:30	**Use of Mo in Ni 620 filler metal to influence the microstructure of brazed hot work steel** Kirsten Bobzin[1], Hendrik Heinemann[1], Markus Apel[2], Bei Zhou[2], Marvin Erck[1] *1: RWTH Aachen University, Surface Engineering Institute (IOT), Germany; 2: ACCESS e.V., Germany*	**Enhancing the sintering quality of lightweight composite materials (AMC) by pressure and current pulses** André Hälsig[1], Sarah Hirsch[1], Thomas Grund[1], Jonas Hensel[1], Thomas Lampke[1], Uwe Funk[2], Jens Huber[2], Gerhard Weber[2] *1: Technische Universität Chemnitz, Germany; 2: Dr. Fritsch Sondermaschinen GmbH*
11:50	**Description of component distortion in aluminum gravity die casting as a result of hindered shrinkage and evaluation of numerical predictions** Nino Wolff, Shrujal Gor, Uwe Vroomen, Andreas Bührig-Polaczek *RWTH Aachen University, Foundry Institute*	**Innovative joining concepts for hotform materials** Jana von der Heydt *Baosteel Tailored Blanks, Germany*
12:10	**Numerical Investigation Of The Influence Of Demolding Temperature On Distortion Prediction In Gravity Die Casting Process** Shrujal Gor, Nino Wolff, Björn Pustal, Andreas Bührig-Polaczek *RWTH Aachen University, Foundry Institute*	**Improvement of diffusion welding by frequency superimposed force application** Björn John, Holger Letsch, Jonas Hensel *Chemnitz University of Technology, Germany*
12:30	**Lunch time**	

WEDNESDAY, 17TH MAY 2023

SESSION 6A: INFLUENCING WELD METAL/LTT
CHAIR: THOMAS KANNENGIEßER

FORD – SAAL

13:30	Keynote Speaker 6 **Designing alloys for optimal microstructures and properties out of the liquid solid-transformation** Dierk Raabe *Max-Planck-Institut für Eisenforschung GmbH, Germany*
14:00	**Analysis of microstructure and mechanical properties of single-pass laser hybrid welded thick-walled steels up to 30 mm with contactless electromagnetic backing** Ömer Üstündag[1], Nasim Bakir[1], Andrey Gumenyuk[1,2], Michael Rethmeier[3,1,2] *1: Bundesanstalt für Materialforschung und -prüfung, Germany; 2: Fraunhofer Institute for Production Systems and Design Technology, Germany; 3: Institute for Machine Tools and Factory Management, Technische Universität Berlin, Germany*
14:20	**Hot cracking behavior of LTT alloys under variable conditions in the Varestraint test** Arne Kromm[1], Maximilian Thomas[1], Philipp Liepold[1], Thomas Kannengiesser[1], Jens Gibmeier[2] *1: Bundesanstalt für Materialforschung und -prüfung (BAM); 2: Institute for Applied Materials (IAM-WK) Karlsruhe Institute of Technology (KIT)*
14:40	**Use of an LTT-effect for the targeted reduction of welding distortion in stainless CrNi steels for an application in rail vehicle construction** Maximilian Gamerdinger[1], Akyel Fatma[1], Simon Olschok[1], Uwe Reisgen[1], Uriel Elliesen[2] *1: RWTH Aachen University, Welding and Joining Institute; 2: Photon Laser Manufacturing GmbH, Germany*
15:00	**Dissimilar material welding in high alloy steel and its effect on distortion and residual stress** Fatma Akyel, Karthik Ravi Krishna Murthy, Maximilian Gamerdinger, Simon Olschok, Uwe Reisgen *RWTH Aachen University, Welding and Joining Institute, Germany*
15:20	Closing remarks by Prof. Reisgen

LIST OF AUTHORS

NAME	ORGANIZATION	SESSION
AKYEL, FATMA	RWTH Aachen University, Welding and Joining Institute, Germany	Influencing Weld Metal/LTT
ALMS, JONATHAN	RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft, Germany	Injection Moulding and Laser Cutting
APEL, MARKUS	Access e. V., Germany	Simulation and Optimization Technique I Coating, Brazing, Casting
BAKIR, NASIM	Bundesanstalt für Materialforschung und -prüfung (BAM), Germany	Influencing Weld Metal/LTT
BAUMGÄRTNER, BENJAMIN	Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Manufacturing Metrology, Germany	Additive Manufacturing II
BAUMGARTNER, JÖRG	Fraunhofer LBF, Germany	Welding II
BECKMANN, FELIX	Institute of Materials Physics, Helmholtz-Zentrum Hereon, Germany	Injection Moulding and Laser Cutting
BEHR, MAREK	RWTH Aachen University, Chair for Computational Analysis of Technical Systems (CATS), Germany	Injection Moulding and Laser Cutting Simulation and Optimization Technique II
BENDER, JAN	RWTH Aachen University, Visual Computing Institute - Computer Animation, Germany	Simulation and Optimization Technique I Simulation and Optimization Technique II
BERNAUER, CHRISTIAN	Technical University of Munich, Institute for Machine Tools and Industrial Management, Germany	Additive Manufacturing I
BOBZIN, KIRSTEN	RWTH Aachen University, Surface Engineering Institute (IOT), Germany	Coating, Brazing, Casting Simulation and Optimization Technique II
BOLD, MARIE-NOEMI	RWTH Aachen University, Digital Additive Production	Additive Manufacturing I
BOURELL, DAVID	The University of Texas at Austin, United States of America	Additive Manufacturing III
BREUNING, CHRISTOPH	Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Collaborative Research Center 814 – Additive Manufacturing (CRC 814) Chair of Materials Science and Engineering for Metals, Germany	Additive Manufacturing III
BRITZ, DOMINIK	Lehrstuhl für Funktionswerkstoffe, Universität des Saarlandes, Germany	BMWK project HL Blech
BÜHRIG-POLACZEK, ANDREAS	RWTH Aachen University, Foundry Institute, Germany	Coating, Brazing, Casting
BURKHARDT, CHRISTIAN	Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Applied Mechanics, Germany	Additive Manufacturing II
BUTTAZZONI, MICHELE	TU Wien, Institute of Production Engineering and Photonic Technologies, Austria	Welding I
CARDIFF, PHILIP	University College Dublin, Ireland	Simulation and Optimization Technique I
CHEN, YUNHUI	ESRF - The European Synchrotron, Grenoble, France; The University of Manchester, Department of Materials, Manchester, Great Britain; RMIT University, School of Engineering, Australia	Welding I
CHOLEWA, SIMON	Lehrstuhl für Kunststofftechnik (LKT), Friedrich- Collaborative Research Center - Additive Manufacturing (CRC 814), Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany	Additive Manufacturing III
DE OLIVEIRA LOPES, MARCELO	RWTH Aachen University, Lehrstuhl für Laserstechnik (LLT), Germany	Injection Moulding and Laser Cutting
DIEGEL, CHRISTIAN	TU Ilmenau, Production Technology Group, Germany	Welding I
DILGER, KLAUS	Institute of Joining and Welding, Technische Universität Braunschweig, Germany	Welding II
DONGJIAN, ZHU	GKN Sinter Metals, Germany	Additive Manufacturing II
DRUMMER, DIETMAR	Institute of Polymer Technology, Collaborative Research Center 814, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany	Additive Manufacturing III
EIKEN, JANIN	Access e. V., Germany	Simulation and Optimization Technique I

ELGETI, STEFANIE	RWTH Aachen University, Chair for Computational Analysis of Technical Systems; Germany TU Wien, Institute of Lightweight Design and Structural Biomechanics, Austria	Simulation and Optimization Technique II
ELLIESEN, URIEL	Photon Laser Manufacturing GmbH, Berlin, Germany	Influencing Weld Metal/LTT
ERCK, MARVIN	RWTH Aachen University, Surface Engineering Institute (IOT), Germany	Coating, Brazing, Casting Simulation and Optimization Technique II Simulation and Optimization Technique II
EVERS, TIMM	RWTH Aachen University, Welding and Joining Institute, Germany	BMWK project HL Blech
FELLERHOFF, JAN	RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft, Germany	Injection Moulding and Laser Cutting
FERRER FABON, BLANCA	RWTH Aachen University, Chair for Computational Analysis of Technical Systems (CATS), Germany	Injection Moulding and Laser Cutting
FERRER FABÓN, BLANCA	RWTH Aachen University, Chair for Computational Analysis of Technical Systems (CATS), Germany	Injection Moulding and Laser Cutting
FLORIAN, TOBIAS	TU Wien, Institute of Production Engineering and Photonic Technologies, Austria	Welding I
FRIEDMANN, HANNES	TU Ilmenau, Production Technology Group, Ilmenau, Germany	Welding I
FRITSCHE, DANIEL COLIN	RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft, Germany	Coating, Brazing, Casting Injection Moulding and Laser Cutting Simulation and Optimization Technique II
FRÖHLICH, FABIAN	TU Ilmenau, Production Technology Group, Ilmenau, Germany	Welding I
FUNK, UWE	Dr. Fritsch Sondermaschinen GmbH, Germany	Welding II
GAMERDINGER, MAXIMILIAN	RWTH Aachen University, Welding and Joining Institute, Germany	Influencing Weld Metal/LTT
GIBMEIER, JENS	Institute for Applied Materials (IAM-WK) Karlsruhe Institute of Technology (KIT), Germany	Influencing Weld Metal/LTT
GILLNER, ARNOLD	RWTH Aachen University, Chair for Laser Technology (LLT), Fraunhofer Institute for Laser Technology (ILT), Germany	Welding I Injection Moulding and Laser Cutting
GOR, SHRUJAL	RWTH Aachen University, Foundry Institute	Coating, Brazing, Casting Simulation and Optimization Technique I
GREINER, SANDRA	Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Polymer Technology (LKT), Germany	Additive Manufacturing III
GRUND, THOMAS	Technische Universität Chemnitz, Germany	Welding II
GUMENYUK, ANDREY	Bundesanstalt für Materialforschung und -prüfung, Germany (BAM), Fraunhofer Institute for Production Systems and Design Technology, Germany	Influencing Weld Metal/LTT
HÄFNER, CONSTANTIN	RWTH Aachen University, Chair for Laser Technology (LLT), Fraunhofer Institute for Laser Technology (ILT), Germany	Welding I
HÄLSIG, ANDRÉ	Technische Universität Chemnitz, Germany	Welding II
HAFENECKER, JAN	Institute of Manufacturing Technology (LFT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing, Germany	Additive Manufacturing I
HAUSOTTE, TINO	Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Manufacturing Metrology, Germany	Additive Manufacturing II Additive Manufacturing III
HEINEMANN, HENDRIK	RWTH Aachen University, Surface Engineering Institute (IOT), Germany	Coating, Brazing, Casting Simulation and Optimization Technique II
HELLWIG, PETER	TU Ilmenau, Production Technology Group, Germany	Welding I
HENSEL, JONAS	Chemnitz University of Technology, Germany	Welding II
HERGES, ADRIAN	Functional Materials Department, Saarland University, Lehrstuhl für Funktionswerkstoffe, Universität des Saarlandes, Germany	BMWK project HL Blech
HERRNBÖCK, LUDWIG	Institute of Applied Mechanics, Friedrich-Alexander University Erlangen-Nuremberg, Germany	Simulation and Optimization Technique I
HIRSCH, SARAH	Technische Universität Chemnitz, Germany	Welding II
HOLLATZ, SÖREN	Fraunhofer Institute for Laser Technology (ILT), Germany	Welding I
HOPMANN, CHRISTIAN	RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft, Germany	Injection Moulding and Laser Cutting Simulation and Optimization Technique II Coating, Brazing, Casting

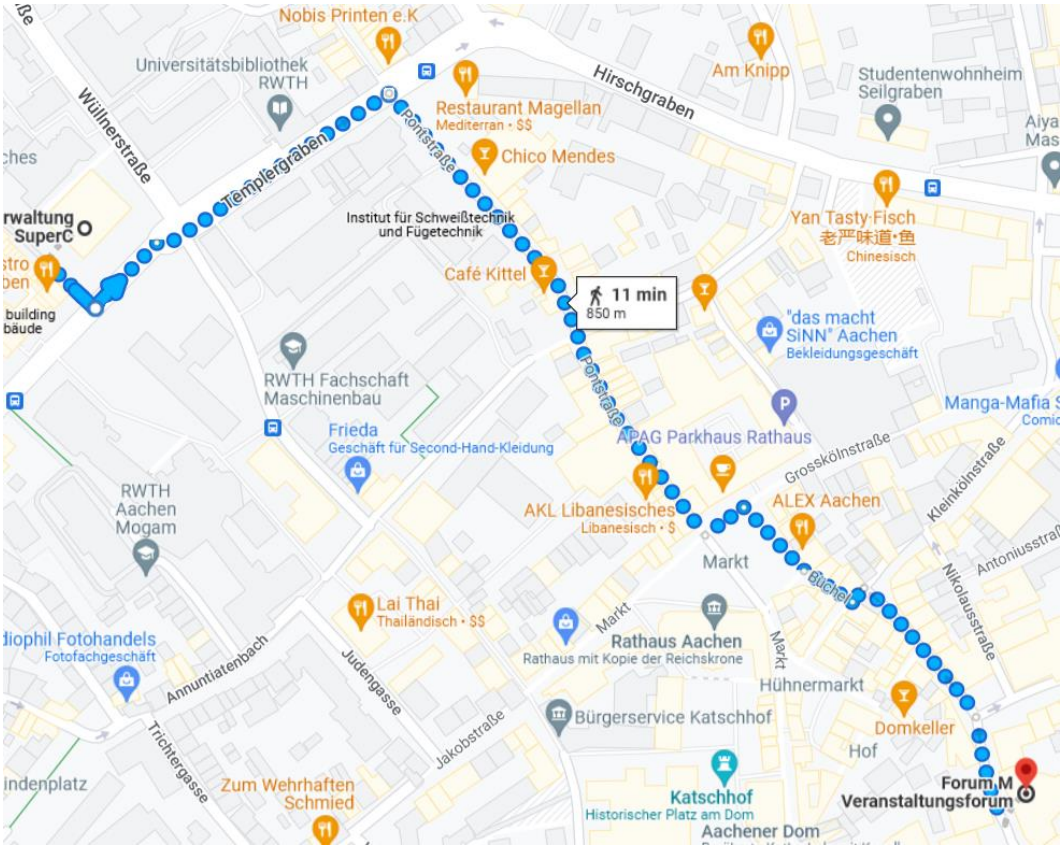
HUBER, JENS	Dr. Fritsch Sondermaschinen GmbH, Germany	Welding II
HÜBNER, DANIEL	Department of Mathematics, Friedrich-Alexander University Erlangen-Nuremberg, Germany	Simulation and Optimization Technique I
HUMMEL, MARC	RWTH Aachen University, Chair for Laser Technology (LLT), Germany	Welding I Injection Moulding and Laser Cutting
HUSSEIN, JUAN	Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany; Institute of Manufacturing Metrology, Germany	Additive Manufacturing II
JAKSCH, ANDREAS	Collaborative Research Center - Additive Manufacturing (CRC 814), Friedrich-Alexander-Universität Erlangen-Nürnberg, Institute of Polymer Technology, Germany	Additive Manufacturing III
JASUTYN, KEVIN	RWTH Aachen University, Surface Engineering Institute (IOT), Germany	Simulation and Optimization Technique II
JESKE, STEFAN RHYS	RWTH Aachen University, Visual Computing Institute - Computer Animation, Germany	Simulation and Optimization Technique II
JOHN, BJÖRN	Chemnitz University of Technology, Germany	Welding II
KAHVE, CEMI EMRE	RWTH Aachen University, Institute for Plastics Processing (IKV) in Industry and Craft, Germany	Coating, Brazing, Casting Injection Moulding and Laser Cutting Simulation and Optimization Technique II
KALLAGE, PETER	COHERENT, Hamburg, Germany	Welding I
KANNENGIESSER, THOMAS	Bundesanstalt für Materialforschung und -prüfung (BAM), Germany	Influencing Weld Metal/LTT
KELLERWESSEL, PAUL JOHANNES	RWTH Aachen University, Welding and Joining Institute, Germany	Simulation and Optimization Technique II
KÖHLER, MARKUS	Institute of Joining and Welding, Technische Universität Braunschweig, Germany	Welding II
KÖPF, JOHANNES	Chair of Materials Science and Engineering for Metals (WTM), Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany	Additive Manufacturing I
KÖRNER, CAROLINE	Chair of Materials Science and Engineering for Metals (WTM), Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Chair of Materials Science and Engineering for Metals, Germany	Additive Manufacturing I Additive Manufacturing II Additive Manufacturing III
KOPP, SEBASTIAN-PAUL	Bavarian Laser Center GmbH (blz), Collaborative Research Center 814 – Additive Manufacturing, Germany	Additive Manufacturing I
KRICHEL, THOMAS	RWTH Aachen University, Welding and Joining Institute, Germany	Welding I
KRISHNA MURTHY, KARTHIK RAVI	RWTH Aachen University, Welding and Joining Institute, Germany	Influencing Weld Metal/LTT
KROMM, ARNE	Bundesanstalt für Materialforschung und -prüfung (BAM), Germany	Influencing Weld Metal/LTT
KRUSE, HENRIK	RWTH Aachen University, Digital Additive Production, Germany	Additive Manufacturing II
KRUSKA, JAN	RWTH Aachen University, Welding and Joining Institute, Germany	Simulation and Optimization Technique I
LAMPKE, THOMAS	Technische Universität Chemnitz, Germany	Welding II
LEHNERT, TOBIAS	AG der Dillinger Hüttenwerke, Germany	BMWK project HL Blech
LENHARD, SÉBASTIEN	AG der Dillinger Hüttenwerke, Germany	BMWK project HL Blech
LETSCH, HOLGER	Chemnitz University of Technology, Germany	Welding II
LIEPOLD, PHILIPP	Bundesanstalt für Materialforschung und -prüfung (BAM), Germany	Influencing Weld Metal/LTT
LIPNICKI, WIKTOR	RWTH Aachen University, Chair for Laser Technology (LLT), Germany	Welding I
LOOSE, TOBIAS	Dr. Loose GmbH	Simulation and Optimization Technique II
LUKSCH, JUTTA	Materials Science and Methods, Saarland University, Germany	BMWK project HL Blech
MÄDE, KONRAD	RWTH Aachen University, Welding and Joining Institute, Germany	Simulation and Optimization Technique II
MARION, MERKLEIN	Institute of Manufacturing Technology (LFT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing, Germany	Additive Manufacturing I
MARKL, MATTHIAS	Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Germany	Additive Manufacturing I Additive Manufacturing II Additive Manufacturing III

MEGAHED, MUSTAFA	ESI Group, France	Additive Manufacturing II
MEINERS, WILHELM	Trumpf Laser- und Systemtechnik SE & Co KG, Germany	Additive Manufacturing I
MERGHEIM, JULIA	Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Applied Mechanics, Germany	Additive Manufacturing II Simulation and Optimization Technique I
MERK, THOMAS	Technical University of Munich, Institute for Machine Tools and Industrial Management, Germany	Additive Manufacturing I
MICHAEL, SCHMIDT	Institute of Photonic Technologies (LPT), Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing, Germany	Additive Manufacturing I
MOKROV, OLEG	RWTH Aachen University, Welding and Joining Institute, Germany	Simulation and Optimization Technique I Simulation and Optimization Technique II
MOOSMANN, JULIAN	Institute of Materials Physics, Helmholtz-Zentrum Hereon, Germany	Injection Moulding and Laser Cutting
MOTZ, CHRISTIAN	Materials Science and Methods, Saarland University, Germany	BMWK project HL Blech
MÜCKLICH, FRANK	Functional Materials Department, Lehrstuhl für Funktionswerkstoffe, Saarland University, Germany	BMWK project HL Blech
MÜLLER, MARTIN	Lehrstuhl für Funktionswerkstoffe, Saarland University, Germany	BMWK project HL Blech
NAGEL, FALK	COHERENT, Hamburg, Germany	Welding I
NAHR, FLORIAN	Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Photonic Technologies (LPT), Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany	Additive Manufacturing II Welding I
OLOWINSKY, ALEXANDER	Fraunhofer-Institut für Lasertechnik (ILT), Germany	Injection Moulding and Laser Cutting
OLSCHOK, SIMON	RWTH Aachen University, Welding and Joining Institute, Germany	BMWK project HL Blech Influencing Weld Metal/LTT
OSSWALD, PAUL	BMW AG, Germany	Additive Manufacturing II
OTTO, ANDREAS	TU Wien, Institute of Production Engineering and Photonic Technologies, Austria	Welding I
PAULY, CHRISTOPH	Lehrstuhl für Funktionswerkstoffe, Universität des Saarlandes, Germany	BMWK project HL Blech
PETRING, DIRK	Fraunhofer-Institut für Lasertechnik (ILT), Germany	Injection Moulding and Laser Cutting
PEUKERT, WOLFGANG	Institute of Particle Technology (LFG), Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany	Additive Manufacturing III
PUSTAL, BJÖRN	RWTH Aachen University, Foundry Institute, Germany	Coating, Brazing, Casting
RAABE, DIERK	Max-Planck-Institut für Eisenforschung GmbH, Germany	Influencing Weld Metal/LTT
RACK, ALEXANDER	ESRF - The European Synchrotron, Grenoble, France	Welding I
RASCH, MICHAEL	Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Photonic Technologies (LPT), Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany	Additive Manufacturing II
REISGEN, UWE	RWTH Aachen University, Welding and Joining Institute, Germany	BMWK project HL Blech Influencing Weld Metal/LTT Simulation and Optimization Technique I Simulation and Optimization Technique II Welding I
RENNER, JAKOB	Lehrstuhl für Werkstoffkunde und Technologie der Metalle, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Chair of Materials Science and Engineering for Metals, Germany	Additive Manufacturing II Additive Manufacturing III
REQUARDT, HERWIG	ESRF - The European Synchrotron, Grenoble, France	Welding I
RETHMEIER, MICHAEL	Institute for Machine Tools and Factory Management, Technische Universität Berlin, Bundesanstalt für Materialforschung und -prüfung (BAM), Fraunhofer Institute for Production Systems and Design Technology, Germany	Influencing Weld Metal/LTT
RITTINGHAUS, SILJA-KATHARINA	Bergische Universität Wuppertal	Additive Manufacturing II
RÖßLER, CHRISTOPH	Sampro GmbH, Germany	Welding II

ROTH, STEPHAN	Bavarian Laser Center GmbH (blz), Collaborative Research Center 814 – Additive Manufacturing, Germany	Additive Manufacturing I
ROTHFELDER, RICHARD	Institute of Photonic Technologies (LPT), Collaborative Research Center 814 – Additive Manufacturing, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany	Additive Manufacturing I Additive Manufacturing III
SAWANNIA, MICHAEL	IFSW – Institut für Strahlwerkzeuge, Germany	Injection Moulding and Laser Cutting
SCHACHT, ANDREAS	RWTH Aachen University, Surface Engineering Institute (IOT), Germany	Coating, Brazing, Casting
SCHÄFER, FLORIAN	Materials Science and Methods, Saarland University, Germany	BMWK project HL Blech
SCHLEIFENBAUM, JOHANNES HENRICH	RWTH Aachen University, Digital Additive Production, Germany	Additive Manufacturing I Additive Manufacturing II
SCHLICHT, SAMUEL	Institute of Polymer Technology, Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814, Germany	Additive Manufacturing III
SCHMIDT, JOCHEN	Institute of Particle Technology (LFG), Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany	Additive Manufacturing III
SCHMIDT, LEANDER	TU Ilmenau, Production Technology Group, Ilmenau, Germany	Welding I
SCHMIDT, MICHAEL	Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Photonic Technologies (LPT), Erlangen Graduate School in Advanced Optical Technologies (SAOT), Germany	Additive Manufacturing II Additive Manufacturing III Welding I
SCHNEIDER, FRANK	Fraunhofer-Institut für Lasertechnik (ILT), Germany	Injection Moulding and Laser Cutting
SCHOLL, SEBASTIAN	Aktien-Gesellschaft der Dillinger Hüttenwerke, Germany;	BMWK project HL Blech
SCHRICKER, KLAUS	TU Ilmenau, Production Technology Group, Ilmenau, Germany	Welding I
SCHÜTZ, JÜRGEN	AG der Dillinger Hüttenwerke, Germany	BMWK project HL Blech
SCHÜTZ, WOLFGANG	AG der Dillinger Hüttenwerke, Germany	BMWK project HL Blech
SEIBOLD, MARC	TU Ilmenau, Production Technology Group, Ilmenau, Germany	Welding I
SERDECZNY, MARCIN	Flow Science Inc., United States of America	Additive Manufacturing II
SETTER, ROBERT	Department of Mechanical Engineering, TUM School of Engineering & Design, Technical University of Munich, Collaborative Research Center 814 – Additive Manufacturing, Germany	Additive Manufacturing I
SHARMA, RAHUL	RWTH Aachen University, Welding and Joining Institute, Germany	Simulation and Optimization Technique I Simulation and Optimization Technique II
SPURK, CHRISTOPH	RWTH Aachen University, Chair for Laser Technology (LLT), Germany	Welding I
STAUDT, THORSTEN	AG der Dillinger Hüttenwerke, Germany	BMWK project HL Blech
STEINMANN, PAUL	Friedrich-Alexander-Universität Erlangen-Nürnberg, Collaborative Research Center 814 – Additive Manufacturing (CRC 814), Institute of Applied Mechanics, Germany	Additive Manufacturing II Simulation and Optimization Technique I
STINGL, MICHAEL	Department of Mathematics, Friedrich-Alexander University Erlangen-Nuremberg, Germany	Simulation and Optimization Technique I
THEUNISSEN, JAN	RWTH Aachen University, Digital Additive Production, Germany	Additive Manufacturing II
THIEL, MARC C.	Materials Science and Methods, Saarland University, Germany	BMWK project HL Blech
THOMAS, MAXIMILIAN	Bundesanstalt für Materialforschung und -prüfung (BAM), Germany	Influencing Weld Metal/LTT
TILLMANN, STEFFEN	RWTH Aachen University, Chair for Computational Analysis of Technical Systems, Germany	Simulation and Optimization Technique II
TISCHER, FLORENTIN	Institute of Particle Technology (LFG), Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany	Additive Manufacturing III
TROMMER, FRANK	Institute of Mechanical Engineering, Hochschule Magdeburg-Stendal, Germany	Welding II
ÜSTÜNDAG, ÖMER	Bundesanstalt für Materialforschung und -prüfung (BAM), Germany	Influencing Weld Metal/LTT
UHLENBERG, LORENZ	Institute of Joining and Welding, Technische Universität Braunschweig, Germany	Welding II
VOGELS, CARSTEN	RWTH Aachen University, Surface Engineering Institute (IOT), Germany	Coating, Brazing, Casting Simulation and Optimization Technique II
VON DER HEYDT, JANA	Baosteel Tailored Blanks, Germany	Welding II

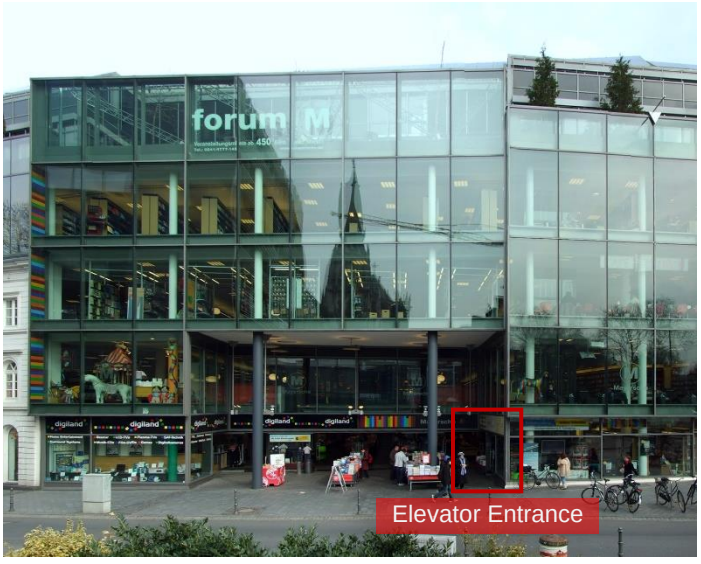
VROOMEN, UWE	RWTH Aachen University, Foundry Institute	Coating, Brazing, Casting
WANK, ANDREAS	GTV Verschleißschutz GmbH, Germany	Coating, Brazing, Casting
WARKENTIN, SERGEJ	RWTH Aachen University, Welding and Joining Institute, Germany	Simulation and Optimization Technique I Simulation and Optimization Technique II
WEBER, GERHARD	Dr. Fritsch Sondermaschinen GmbH, Germany	Welding II
WEIN, FABIAN	Department of Mathematics, Friedrich-Alexander University Erlangen-Nuremberg, Germany	Simulation and Optimization Technique I
WESTHOFEN, LUKAS	RWTH Aachen University, Visual Computing Institute, Germany	Simulation and Optimization Technique I Simulation and Optimization Technique II
WOLFF, NINO	RWTH Aachen University, Foundry Institute, Germany	Coating, Brazing, Casting Simulation and Optimization Technique I
WUDY, KATRIN	Department of Mechanical Engineering, TUM School of Engineering & Design, Technical University of Munich, Collaborative Research Center 814 – Additive Manufacturing, Germany	Additive Manufacturing I
YANG, ZERONG	Chair of Materials Science and Engineering for Metals (WTM), Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany	Additive Manufacturing I
ZAEH, MICHAEL F.	Technical University of Munich, Institute for Machine Tools and Industrial Management, Germany	Additive Manufacturing I
ZAPATA, AVELINO	Technical University of Munich, Institute for Machine Tools and Industrial Management, Germany	Additive Manufacturing I
ZENZ, CONSTANTIN	TU Wien, Institute of Production Engineering and Photonic Technologies, Austria	Welding I
ZHOU, BEI	ACCESS e.V., Germany	Coating, Brazing, Casting Simulation and Optimization Technique I
ZIELINSKI, JONAS	RWTH Aachen University, Digital Additive Production, Germany	Additive Manufacturing I Additive Manufacturing II

FORUM M ROUTE DESCRIPTION



Venue Address

Forum M
Buchkremerstraße 1-7
52062 Aachen



Forum M is within 11 minutes walking distance from Super C. The venue can be reached by taking the elevator in front of the “Mayersche” bookshop.