MID Congress | 2025

Mechatronic Integration Discourse

2.-3. July 2025

Amberg Congress Center, Germany

Preliminary Program

Opening Keynotes by **Nano Dimension** & **OE-A**	**12 Scientific Sessions** & Networking	Exklusive **Technical Tour Siemens** Plant Amberg	MID Best PhD and Best Paper **Awards**	**IPC Workshop** on 3D Electronics Standardisation

In cooperation with:

About the MID Mechatronic Integration Discourse 2025

The global megatrends of 2025—rising energy demand, CO_2 reduction, urbanization, automation, and digitalization—are intensifying the need for compact, efficient, and intelligent technologies. Mechatronic Integrated Devices (MID), which integrate electronic functions directly into three-dimensional mechanical structures, offer a powerful response to these challenges. They enable miniaturized, material-efficient, and functionally integrated solutions across industries such as automation, medical technology, and smart infrastructure.

The **3D MID Congress 2025** at the **Amberg Congress Center** brings together experts from research and industry to present and discuss the latest developments in MID technologies. This year's focus includes topics like **MID design, integrated sensors, antenna structures, additive and hybrid manufacturing**, and the role of MID in resilient, localized production systems. Highlights of the congress include an industrial exhibition, and a **dedicated IPC workshop** on standardization in 3D electronic integration.

A particular highlight is the **technical tour of the Siemens Electronics Plant in Amberg**, offering participants a real-world view of digitalized, automated production at a world-class facility. With its rich program of presentations, networking, and hands-on experiences, the 3D MID Congress 2025 provides deep insight into how MID technologies help shape the intelligent, sustainable systems of tomorrow.

SIEMENS

Publication

The scientific contributions will be presented orally in various sessions or as poster presentations. All scientifically accepted papers, will be submitted for inclusion into IEEE Xplore subject to meeting IEEE Xplore's scope and quality requirements.

Opening time conference

IEEE

Wednesday, 2nd July 2025, 08:30 AM – 05:15 PM
Thursday, 3rd July 2025, 08:30 AM – 05:00 PM

Contact

Conference Coordinator
Prof. Dr. Florian Risch
phone: +49 (0)1520 3137077
email: florian.risch@faps.fau.de

Research Association 3-D MID e.V.
Fuerther Str. 246b
GER-90429 Nuremberg
Phone: +49 911 5302-99100
E-Mail: congress@3dmid.de
www.3d-mid.de

FOREWORD BY THE CONFERENCE HOST

Dear distinguished experts in Mechatronic Integrated Devices!

The Internet of Things (IoT) is reshaping our daily lives: Devices like laptops, tablets, and smartphones translate speech in real time, answer semantic questions, and assist us seamlessly. Autonomous vehicles avoid traffic using live data and alert others to hazards. In smart factories, objects exchange data, parts select optimal processing routes, and machines report maintenance needs early. Wearables monitor vital signs, track movement, and display key information through glasses.

These innovations—part of Cyber-Physical Systems—combine sensing, intelligence, energy management, and communication in compact, lightweight designs. Antennas must be integrated three-dimensionally, as space for flat PCBs and mechanical parts becomes limited.

Mechatronic integration spans from MEMS on the chip level to complete systems, merging mechanics, electronics, thermals, magnetics, optics, and computer science. Spatial solutions are increasingly vital, and processes like structuring, metallization, and printing must evolve to embed functions on diverse materials—ceramics, fabrics, films, paper, even skin.

The **3D MID Mechatronic Integration Discourse 2025** in Amberg will explore topics ranging from additive mechatronics and radar systems to advanced contacting and thermal management. This unique event offers insights, research, and networking opportunities for innovators and industry experts alike.

Join us in Amberg for two inspiring days of mechatronic innovation!

Prof. Dr. Jörg Franke

Organizing Committee

Prof. Franke, J. – University Erlangen-Nuremberg, GER
Dr. Pojtinger, A. – 2E mechatronic GmbH & Co. KG, GER
Dr. Reinhardt, A. – Seho Systems GmbH, GER
Prof. Risch, F. – Managing Director 3-D MID e.V., GER
Landvogt, S. – Commercial Management 3-D MID e.V., GER

International Program Committee

Prof. Bastian, M. - SKZ, GER
Barth, M. - TEPROSA GmbH, GER
Baecker, D. - LPKF Laser & Electronics AG, GER
Prof. Bock, K. - TU Dresden, GER
Prof. Brabec, C. - University Erlangen-Nuremberg, GER
Prof. Christiansen, S. – Fraunhofer IKTS, GER
Prof. Drummer, D. - University Erlangen-Nuremberg, GER
Prof. Dumitrescu, R. - Fraunhofer IEM, GER
Prof. Feldmann, K. - Research Association 3-D MID e. V., GER
Prof. Franke, J. - University Erlangen-Nuremberg, GER
Prof. Gausemeier, J. - Heinz Nixdorf Institute, GER
Harder, T. - ECPE European Center f. Power Electronics, GER
Hellmich, M. - MID Solutions GmbH, GER
Prof. Helmreich, K. - University Erlangen-Nuremberg, GER
Dr. Hertweck, B. - Kern-Liebers, GER
Hess, T. - HARTING AG, SUI
Dr. Juergenhake, C. - Juergenhake GmbH, GER
Prof. Kaloudis, M. - TH Aschaffenburg, GER
Dr. Krueger, R. - LPKF Laser & Electronics AG, GER
Prof. Kuhmann, K. - Evonik Industries AG, GER
Prof. Manteuffel, D. - University Hannover, GER
Mildner, W. - MSWtech, GER
Dr. Moguedet, M. - S2P, FR
Obermaier, J. - HUAWEI Techn. Duesseldorf GmbH, GER
Dr. Pojtinger, A. - 2E mechatronic GmbH & Co. KG, GER
Prof. Reichenberger, M. - TH Nuremberg, GER
Dr. Thomas Reitberger, GER
Dr. Reinhardt, A. - Seho Systems GmbH, GER
Prof. Risch, F. - University Erlangen-Nuremberg, GER
Rohde, H. - Robert Bosch GmbH, GER
Prof. Schulze, V. - Karlsruhe Institute of Technology, GER
Weisbrod, E. - Siemens AG, GER
Zadarej, V. - Molex Inc., US
Prof. Zimmermann, A. - Hahn-Schickard, GER

Time Schedule
Overview of the Conference

Wednesday, 2nd July 2025

08:30 AM	Welcome Coffee	
09:15 AM	**Welcome Speech**, Prof. Franke, J.; Prof. Risch, F., FAU Erlangen-Nbg., FAPS	
09:35 AM	**Opening Keynote I:** Dr. Del Rey, R., Nano Dimension	
10:05 AM	**Opening Keynote II**: Sendhil Sasikala, R., OE-A	
10:35 AM	Coffee Break	
	Track 1: Main Hall, 1st floor	**Track 2: Conference Room,** 2nd floor
11:05 AM	**Session 1:** MID based HF applications	**Session 2:** 3D MID Design Tools
12:20 AM	Lunch Break in Foyer Ground Floor and Poster Session	
01:30 PM	**Session 3:** Additive Mechatronics	**Session 4:** Sensor Integration in MID
02:45 PM	Coffee Break	
03:15 PM	**Session 5:** Innovative Additive Manufactured Antenna Technologies	**Session 6:** Optical systems and Wire-based Additive Mechatronics
05:30 PM	Evening Event @ Amberg Congress Center (ACC)	

Thursday, 3rd July 2025

	T1: Main Hall, 1st floor	**T2: Conf. Room,** 2nd floor	**T3: Room 3-4,** 2nd floor
09:00 AM	**Session 7:** Advancements in ML & Machine Vision	**Session 8:** Medical Applications with MID	**Session 9:** 3D-HF-MID Colloquium I
09:50 AM	Coffee Break		
10:20 AM	**Session 10:** Laser-Based Joining & Metallization for MID	**Session 11:** Advanced Thermal Management for MID	**Session 12:** 3D-HF-MID Colloquium II
11:35 AM	Lunch Break in Foyer Ground Floor and Poster Session		
	Track 1: Main Hall, 1st floor	**Track 2: Conference Room,** 2nd floor	
12:40 PM	**Session 13:** Advanced Contacting Techniques for Printed Electronics and Mechatronics	**Session 14:** Metallization for Power Electronics and Solid State Batteries	
01:55 PM	Coffee Break		
02:10 PM	**Closing Keynote I: Fourcade, F., IPC**		
02:35 PM	**Closing Keynote II: Heisler, P., Siemens AG**		
03:00 PM	**MID Awards and Closing Words**		
03:15 PM	**End of the Conference and Transfer in Special Events**		
03:30 PM	Technical Tour @ The Impulse of Electronics Work Amberg (EWA)	IPC Workshop on standardization of 3D plastronics	
05:00 PM	**End of Special Events**		

Time Schedule
Detailed Time Plan

Wednesday, 2nd July 2025

08:30 AM	Welcome Coffee	
09:15 AM	**Welcome Speech**, Prof. Dr. Franke, J., Prof. Dr. Risch, F., FAU Erlangen-Nürnberg, FAPS	
09:35 AM	**Opening Keynote I:** New Design Thinking through Additively Manufactured Electronics, Dr. Del Rey, R., Nano Dimension	
10:05 AM	**Opening Keynote II**: Integration of Printed Electronics into Mechanical Parts Sendhil Sasikala, R., OE-A	
10:35 AM	Coffee Break	
	Track 1: Main Hall, 1st floor	**Track 2: Conference Room,** 2nd floor
	Session 1: MID based HF applications Session Chair: Dr. Reinhardt, A.	**Session 2:** 3D MID Design Tools Session Chair: Dr. Seidel, R.
11:05 AM	Metasurface Antenna for LEO Satellite Communication at 30 GHz via LDS Hobballah, H., S2P	MID-Mechatronic Technologies from the Perspective of Mechanical Design and the Development Process Braun, S., MDI Steffen Braun
11:30 AM	3D Functionalization for High Frequency Applications (3D-HF-MID) Bader, T., FAU, LHFT	Systems Engineering Methods for Automating MID Design Schobert, M., FAU, FAPS
11:55 AM	MID as an Enabler for the Integration of 77GHz Automotive Radar Systems onto Plastic Surfaces Mager, T., Fraunhofer IEM	Development for 3D MID Design Tools Zeitler, J., FAU, FAPS
12:20 AM	Lunch Break in Foyer Ground Floor and Poster Session	
	Session 3: Additive Mechatronics Session Chair: Dr. Reitelshöfer, S.	**Session 4:** Sensor Integration in MID Session Chair: Dr. Goth, C.
01:30 PM	Rebooting Additive Electronics: Reliable End-to-End Fabrication Dickerboom, J., KRONOS Mechatronics	Comparative Analysis of Manuf. Approaches for Sensor-Integrated Machine Comp.: Case Study on 3D-MID, Flex-Rigid PCBs, & Tradit. PCBs Piechulek, N., FAU, FAPS
01:55 PM	New Materials for the Realization of Product-Related Prototypes Deckert, M., Harting	Advances in Laser Processing of Printed Thin Films for Sensor Applications Dr. Fink, S., Fraunhofer ILT
02:20 PM	Plastronic Functionalization of 3D-Printed Composite Parts made of PA6 and Short Carbon Fibers reinforced with Continuous Carbon Fibers Gerdil, D., AMPERE	Circuit and Sensor Applications on Plant Leaves Using Spray-Coated Conductive Polymers Duong, B., Fraunhofer EFMT
02:45 PM	Coffee Break	

**Session chairs and scheduled sessions are subject to change*

Time Schedule
Detailed Time Plan

Wednesday, 2nd July 2025

02:45 PM	Coffee Break	
	Track 1: Main Hall, 1st floor	**Track 2: Conference Room,** 2nd floor
	Session 5: Innovative Additive Manufacturing & Innovative Antenna Technologies Session Chair: tbd.	**Session 6:** Optical Systems and Wire-based Additive Mechatronics Session Chair: Dr. Kordass, T.
03:15 PM	Development of MID based fully Integrated Radar Systems for the Automotive Industry Diri, J., Fraunhofer IEM	Ultra Precise Dispensing on Complex Structures Nawrot, W., XTPL
03:40 PM	Diode Laser Array Sintering of Printed Metallic Structures on Flexible Substrates Dr. Vinnichenko, M., Fraunhofer IKTS	Programmable Morphing Surfaces Using Embedded Heating and Auxetic Unit Cells Ziervogel, F., Fraunhofer IWU
04:05 PM	Particle-Based Process Simulation for Additive Manufacturing Blank, M. Engineering Office Dr. Michael Blank	In-Situ Refractive Index Measurement of ZIF-8 Thin Films on Optical Fibers Abb, V., OTH Regensburg
05:30 PM	Evening Event @ Amberg Congress Center (ACC)	

**Session chairs and scheduled sessions are subject to change*

Time Schedule
Detailed Time Plan

Thursday, 3rd July 2025

08:30 AM	Welcome Coffee	
	Track 1: Main Hall, 1st floor	**Track 2: Conference Room,** 2nd floor
	Session 7: Advancements in Machine Learning and Machine Vision Session Chair: Dr. Kuehl, A.	**Session 8:** Medical Applications with MID Session Chair: tbd.
09:00 AM	The Potential of Hybrid and Fully Quantum ML Models in Machine Vision: A State-of-the-Art Review Schlichte, S., FAU, FAPS	PreciEye – Precision Enhancement of Contactless Intraocular Pressure Measurement for Self-Diagnosis Engelhardt, H., FAU, FAPS
09:25 AM	Data and AI Platforms for the Electronics Manufacturing Industry Raffin, T., Tensoryze	Integrating Medical Sensors into Everyday Objects Pfeiffer, N. Fraunhofer IIS
09:50 AM	Coffee Break	
	Session 10: Laser-Based Joining and Metallization for MID Session Chair: Dr. Eberhardt, W.	**Session 11:** Advanced Thermal Management for MID Session Chair: Dr. Braeuer, P.
10:20 AM	Influence of Weld Seam Geometry and Length on the Strength and Connection Area for Laser Beam Welding of Copper Seffer, S., Laser Zentrum Hannover	Evaluation and Improvement of the Thermal Performance of Power Modules using the FEM and MMAM Lehmann, C.-L., KIT, wbk
10:45 AM	Recent advantages on LASER induced direct metallization of Al2O3 and ZTA ceramics Schilling, A., University of Stuttgart	Design and Electro-Thermal-Simulation of a Printed Heating Structure for Radome De-Icing Siah, K. S., FAU, FAPS
11:10 AM	Fabrication of Pre-Alloyed Copper-Titanium Composite Layers on Ceramic Substrates for Power Electronics using Laser Powder Bed Fusion Hecht, C., FAU, FAPS	A Comprehensive Study on the Thermal Properties of MID Lacquer Technologies: Evaluating Aluminum as a MID Base Material Mecke, B., Fraunhofer IEM
11:35 AM	Lunch Break in Foyer Ground Floor and Poster Session	

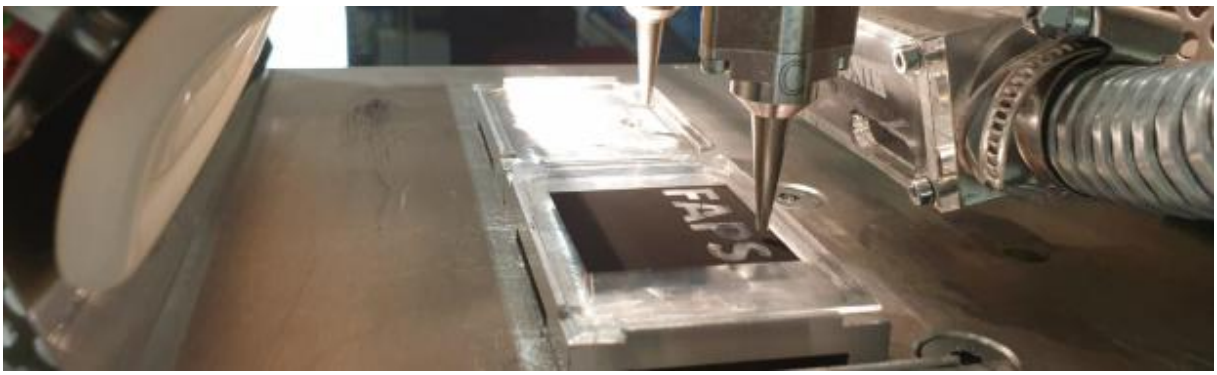
**Session chairs and scheduled sessions are subject to change*

Time Schedule

Detailed Time Plan of Special Event: 3D-HF-MID Colloquium

Thursday, 3rd July 2025

08:30 AM	Welcome Coffee
	Track 3: Room 3-4. 2nd floor
	Session 9: 3D-HF-MID Colloquium I (3D-functionalization for HF applications) Session Chair: Utsch, D.
09:00 AM	Introduction of the DFG approach 3D-functionalization for HF applications (3D-HF-MID), Utsch, D., FAU, FAPS
09:10 AM	Modeling HF properties of printed materials and their surfaces, Bader, T., FAU, LHFT
09:20 AM	Dielectric materials for HF applications, Barabash, A., i-meet, FAU
09:30 AM	Highly conductive composites for production of layers with adjustable conductivity gradients, Fan, Q., FAU, Biomat
09:40 AM	Online control of aerosol-jet printing process by integration of laser transmission analysis, Majumdar, S., FAU, FAPS
09:50 AM	Coffee Break
	Session 12: 3D-HF-MID Colloquium II (3D-functionalization for HF applications) Session Chair: Utsch, D.
10:20 AM	Investigation of the influence of sintering on macro and micro geometry of 3D HF structures, Voigt, C., FAU, FAPS
10:30 AM	Simulation and optimization of aerosol-jet printing process, Schoettner, J., Forschungszentrum Jülich GmbH
10:40 AM	Life time models for printed 3D HF structures, Utsch, D., FAU, FAPS
10:50 AM	Conceptualization, draft and metrological verification of 3D-functional HF components, tbd.
11:00 AM	Special Poster Session 3D-HF-MID
11:35 AM	Lunch Break in Foyer Ground Floor and Poster Session



**Session chairs and scheduled sessions are subject to change*

Time Schedule
Detailed Time Plan

Thursday, 3rd July 2025

11:35 AM	Lunch Break in Foyer Ground Floor and Poster Session	
	Track 1: Main Hall, 1st floor	**Track 2: Conference Room,** 2nd floor
	Session 13: Advanced Contacting Techniques for Printed Electronics and Mechatronics Session Chair: Prof. Reichenberger, M.	**Session 14:** Metallization for MID, Power Electronics and Solid State Batteries Session Chair: Dr. Stoll, T.
12:40 PM	Forming and Welding of Wire Materials for Mechatronic Applicatons Hertweck, B., Kern-Liebers	Atmospheric Plasma Spraying for Coating Copper Current Collectors on Solid-State Battery Components Borchers, A., Fraunhofer IKTS
01:05 PM	Towards an Innovative Approach to Connect Printed Electronics to the Aircraft Cabin Electrical System Fröhlich, J., FAU, FAPS	Thin-Film Technologies: Gas-Phase Based Thin-Film Processing Krug, M., Fraunhofer IKTS
01:30 AM	Near-Infrared LED Reflow Soldering for Flexible Hybrid Electronics Wenger, T., TH Nuremberg	Near-Infrared Laser Structuring and Wet-Chemical Metallization of Aluminum-Oxide using a Laser Absorption Layer Dr. Braeuer, P., FAU, FAPS
01:55 PM	Coffee Break	
02:10 PM	**Closing Keynote I:** Standardization of 3D Plastronics, Fourcade, F., IPC International, Inc.	
02:35 PM	**Closing Keynote II:** Mastering VUCA Challenges with CRISP Manufacturing, Heisler, P., Siemens AG	
03:00 PM	**MID Awards (Best Paper & PhD-Thesis) and Closing Words** Prof. Dr. Risch, F., FAU Erlangen-Nuremberg, FAPS	
03:15 PM	**End of the Conference and Transfer in Special Events**	
03:30 PM	Technical Tour @ The Impulse of Electronics Work Amberg (EWA)	IPC Workshop on standardization of 3D plastronics
	SIEMENS 	IPC WORKS
05:00 PM	**End of Special Events**	

**Session chairs and scheduled sessions are subject to change*

| Registration

Secure your spot at the Congress 2025 and benefit from exciting lectures, networking opportunities and inspiring discussions.

https://www.3d-mid.de/kongress/teilnehmer/teilnehmer_anmeldung.php

| Congress Fees (plus VAT)

Standard fee	€ 1.180,-
Reduced fee*	€ 880,-

**for members of 3-D MID e.V. and speakers*

| Contact Research Association 3-D MID e.V.

Fuerther Str. 246b
GER-90429 Nuremberg
Phone: +49 911 5302-99100
E-Mail: congress@3dmid.de
Web: www.3d-mid.de

| Conference Venue

Amberger Congress Centrum
Schießstaetteweg 8
92224 Amberg

Amberg, the major regional center in northern Bavaria with a stunning location, is easy and quick to reach by all means of transportation. The Amberg Congress Center is located right next to the historic old town, beside the “Kurfuerstenbad” and the city park. Convenient parking is available directly at the ACC in the Kurfuersten underground car park, offering approximately 240 spaces.

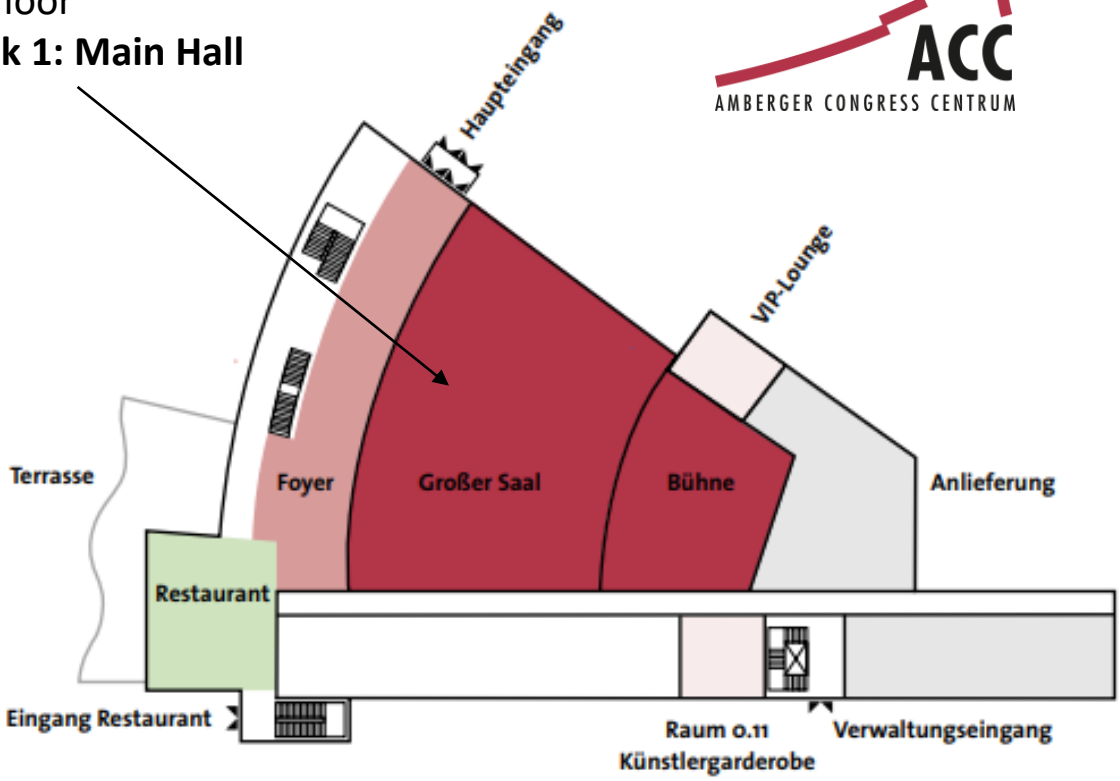
| Venue Technical Tour SIEMENS

Impulse of Electronics Work Amberg (EWA)
Heinrich-Hertz-Straße 1, 92224 Amberg

| CONFERENCE VENUE

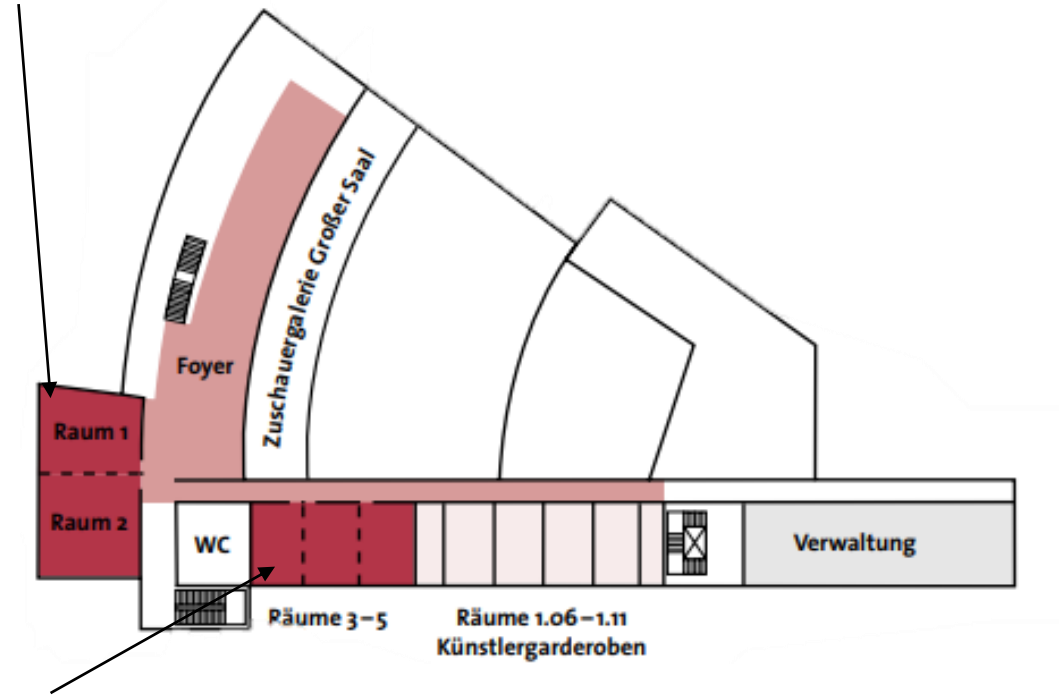
1st floor

Track 1: Main Hall



2nd floor

Track 2: Conference Room



Track 3: Room 3-4