Benjamin Alt

Curriculum Vitae

benjamin.alt@uni-bremen.de

Personal website: benjaminalt.github.io

Born: September 16, 1993—Karlsruhe, Germany
Nationality: German

Current Position

Co-Founder and Chief Scientific Officer, AICOR Solutions GmbH

Areas of Specialisation

Artificial Intelligence, Cognitive Robotics, AI Safety, Human-AI Interaction

Education

2020-2025 PH.D. in Computer Science - *magna cum laude*
Institute for Artificial Intelligence, University of Bremen, Germany
Dissertation: *Neurosymbolic Robot Programming: A Framework for AI-Enabled Programming of Robot Manipulation Tasks* Advisor: Prof. Dr. Michael Beetz
Committee: Prof. Dr. Aude Billard, Prof. Dr. Tania Schultz, Prof. Dr. Nico Hochgeschwender

2017-2019 M.SC. Computer Science
- *with distinction* Institute for Anthropomatics and Robotics, Karlsruhe Institute of Technology, Germany

2015-2017 B.SC. Computer Science
Institute for Anthropomatics and Robotics, Karlsruhe Institute of Technology, Germany

2012-2015 B.A. Political Science
- *summa cum laude* Institut d'Études Politiques de Paris, France and Princeton University, NJ, USA

Professional Experience

2025- Co-Founder and Chief Scientific Officer, AICOR Solutions GmbH, Bremen, Germany

2025-2026 Technical Director, AICOR Institute for Artificial Intelligence, University of Bremen, Germany

2024-2025 Senior Team Lead Research, ArtiMinds Robotics, Karlsruhe, Germany

2023-2024 Senior Research Scientist, ArtiMinds Robotics, Karlsruhe, Germany

2019-2022 Research Scientist, ArtiMinds Robotics, Karlsruhe, Germany

2017-2019 Junior Software Engineer, ArtiMinds Robotics, Karlsruhe, Germany

2016-2017 Student Engineer, ArtiMinds Robotics, Karlsruhe, Germany

2015-2016 Student Engineer, WIBU Systems AG, Karlsruhe, Germany

Publications

Book Chapters

2022 L. Kluy, L. Kölmel, B. Alt, M. Baumgartner, B. Deml, L. Hornung, D. Katic, S. Kinkel, T. Kopp, M. Lorenz, P. Nicolai, N. Riedel, A. Schäfer, and C. Wurll, "Mensch-Roboter-Kollaboration in KMU – Potenziale identifizieren, analysieren und realisieren," de, in *Digitalisierung der Arbeitswelt im Mittelstand 1: Ergebnisse und Best Practice des BMBF-Forschungsschwerpunkts "Zukunft der Arbeit: Mittelstand – innovativ und sozial"*, V. Nitsch, C. Brandl, R. Häußling, J. Lemm, T. Gries, and B. Schmenk, Eds., Berlin, Heidelberg: Springer, 2022, pp. 55–97, ISBN: 978-3-662-64803-2. DOI: 10.1007/978-3-662-64803-2_3 [Online]. Available: https://doi.org/10.1007/978-3-662-64803-2_3

2020 B. Graf, F. Jordan, G. Blume, R. Martin, M. Abdel-Keream, P. Mania, F. Gronbach, C. Emmerich, R. Schaller, D. Katic, and B. Alt, "RoPHa - Robuste Wahrnehmungsfähigkeiten für Roboter zur Unterstützung älterer Nutzer im häuslichen Umfeld," in *Autonome Roboter für Assistenzfunktionen*, Dortmund: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, 2020, pp. 118–133. [Online]. Available: http://publica.fraunhofer.de/documents/N-618329.html

Refereed Journal Articles

2025 A. Schüßler, C. Kunz, R. Younis, B. Alt, J. Paik, M. Wagner, and F. Mathis-Ullrich, "Semi-Autonomous Robotic Assistance for Gallbladder Retraction in Surgery," *IEEE Robotics and Automation Letters*, vol. 10, no. 7, pp. 7468–7475, Jul. 2025, ISSN: 2377-3766. DOI: 10.1109/LRA.2025.3577430

2024 A. Schultheis, B. Alt, S. Bast, A. Guldner, D. Jilg, D. Katic, J. Mundorf, T. Schlagenhauf, S. Weber, R. Bergmann, S. Bergweiler, L. Creutz, G. Dartmann, L. Malburg, S. Naumann, M. Rezapour, and M. Ruskowski, "EASY: Energy-Efficient Analysis and Control Processes in the Dynamic Edge-Cloud Continuum for Industrial Manufacturing," en, *KI - Künstliche Intelligenz*, Sep. 2024, ISSN: 1610-1987. DOI: 10.1007/s13218-024-00868-3 [Online]. Available: https://doi.org/10.1007/s13218-024-00868-3

Conference Proceedings

2025 R. Younis, B. Alt, C. Kunz, T. Peretto, W. Meier, M. Daum, A. Rodriguez Jimenez, S. Bodenstedt, S. Speidel, M. Distler, J. Weitz, D. Katic, F. Mathis-Ullrich, and M. Wagner, "Robotic Automation of Gallbladder Retraction for Laparoscopic Cholecystectomy: An Exploratory Study," in *Proceedings of the 14th Conference on New Technologies for Computer/Robot Assisted Surgery*, Lisbon, Portugal: CRAS, 2025, pp. 79–80, ISBN: 978-90-828931-8-2.

B. Alt, C. Kienle, D. Katic, R. Jäkel, and M. Beetz, "Shadow Program Inversion with Differentiable Planning: A Framework for Unified Robot Program Parameter and Trajectory Optimization," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, Atlanta, USA: IEEE, May 2025. DOI: 10.48550/arXiv.2409.08678

C. Kienle, B. Alt, D. Katic, and R. Jäkel, "QueryCAD: Grounded Question Answering for CAD Models," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, arXiv:2409.08704 [cs], Atlanta, USA: IEEE, May 2025. DOI: 10.48550/arXiv.2409.08704 [Online]. Available: http://arxiv.org/abs/2409.08704

C. Kienle, B. Alt, F. Schneider, T. Pertlwieser, R. Jäkel, and R. Rayyes, "AI-based Framework for Robust Model-Based Connector Mating in Robotic Wire Harness Installation," arXiv:2503.09409 [cs], Los Angeles: IEEE, Aug. 2025. DOI: 10.48550/arXiv.2503.09409 [Online]. Available: http://arxiv.org/abs/2503.09409

2024

B. Alt, U. Keßner, A. Taranovic, D. Katic, A. Hermann, R. Jäkel, and G. Neumann, "Domain-Specific Fine-Tuning of Large Language Models for Interactive Robot Programming," in *European Robotics Forum 2024*, C. Secchi and L. Marconi, Eds., ser. Springer Proceedings in Advanced Robotics, vol. 32, Rimini, Italy: Springer Nature Switzerland, Mar. 2024, pp. 274–279. DOI: 10.1007/978-3-031-76424-0_49 [Online]. Available: https://link.springer.com/chapter/10.1007/978-3-031-76424-0_49

B. Alt, F. Stöckl, S. Müller, C. Braun, J. Raible, S. Alhasan, O. Rettig, L. Ringle, D. Katic, R. Jäkel, M. Beetz, M. Strand, and M. F. Huber, "RoboGrind: Intuitive and Interactive Surface Treatment with Industrial Robots," in *2024 IEEE International Conference on Robotics and Automation (ICRA)*, Yokohama, Japan: IEEE, May 2024, pp. 1–8, ISBN: 979-8-3503-8457-4. DOI: 10.1109/ICRA57147.2024.10611143 [Online]. Available: https://ieeexplore.ieee.org/document/10611143

B. Alt, J. Dvorak, D. Katic, R. Jäkel, M. Beetz, and G. Lanza, "BANSAI: Towards Bridging the AI Adoption Gap in Industrial Robotics with Neurosymbolic Programming," in *Procedia CIRP*, arXiv:2404.13652 [cs], vol. 130, Póvoa de Varzim, Portugal: Elsevier B.V., Jan. 2024, pp. 532–537. DOI: 10.1016/j.procir.2024.10.125 [Online]. Available: https://www.sciencedirect.com/science/article/pii/S2212827124012824

B. Alt, J. Zahn, C. Kienle, J. Dvorak, M. May, D. Katic, R. Jäkel, T. Kopp, M. Beetz, and G. Lanza, "Human-AI Interaction in Industrial Robotics: Design and Empirical Evaluation of a User Interface for Explainable AI-Based Robot Program Optimization," in *Procedia CIRP*, arXiv:2404.19349 [cs], vol. 130, Póvoa de Varzim, Portugal: Elsevier B.V., Apr. 2024, pp. 591–596. DOI: 10.1016/j.procir.2024.10.134 [Online]. Available: https://www.sciencedirect.com/science/article/pii/S2212827124012915

C. Kienle, B. Alt, O. Celik, P. Becker, D. Katic, R. Jäkel, and G. Neumann, "MuTT: A Multimodal Trajectory Transformer for Robot Skills," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, arXiv:2407.15660 [cs], Abu Dhabi, United Arab Emirates: IEEE, Aug. 2024, pp. 9644–9651, ISBN: 979-8-3503-7770-5. DOI: 10.1109/IROS58592.2024.10802198 [Online]. Available: https://ieeexplore.ieee.org/document/10802198

2023

J. Raible, O. Rettig, B. Alt, A. Yaman, I. Gauger, L. Biasi, S. Müller, D. Katic, M. Strand, and M. F. Huber, "Artificial Neural Network Guided Compensation of Nonlinear Payload and Wear Effects for Industrial Robots," in *2023 IEEE 19th International Conference on Automation Science and Engineering (CASE)*, ISSN: 2161-8089, Auckland, New Zealand: IEEE, Aug. 2023, pp. 1–8, ISBN: 979-8-3503-2069-5. DOI: 10.1109/CASE56687.2023.10260559 [Online]. Available: https://ieeexplore.ieee.org/document/10260559

F. Stöckl, M. Strand, S. Müller, M. Huber, J. Raible, C. Braun, D. Katic, B. Alt, and H. Merkt, "Autonomous Surface Grinding of Wind Turbine Blades," en, in *Intelligent Autonomous Systems 18*, S.-G. Lee, J. An, N. Y. Chong, M. Strand, and J. H. Kim, Eds., Cham: Springer Nature Switzerland, Jul. 2023, pp. 451–457, ISBN: 978-3-031-44981-9. DOI: 10.1007/978-3-031-44981-9_38 [Online]. Available: https://link.springer.com/chapter/10.1007/978-3-031-44981-9_38

B. Alt, F. K. Kenfack, A. Haidu, D. Katic, R. Jäkel, and M. Beetz, "Knowledge-Driven Robot Program Synthesis from Human VR Demonstrations," in *Proceedings of the 20th International Conference on Principles of Knowledge Representation and Reasoning*, Rhodes, Greece: IJCAI, Sep. 2023, pp. 34–43, ISBN: 978-1-956792-02-7. DOI: 10.24963/kr.2023/4 [Online]. Available: https://doi.org/10.24963/kr.2023/4

B. Alt, M. D. Nguyen, A. Hermann, D. Katic, R. Jäkel, R. Dillmann, and E. Sax, "EfficientPPS: Part-aware Panoptic Segmentation of Transparent Objects for Robotic Manipulation," in *ISR Europe 2023*, Stuttgart, Germany: VDE Verlag, Sep. 2023, ISBN: 978-3-8007-6140-1. [Online]. Available: https://www.vde-verlag.de/proceedings-en/456140019.html

2022 B. Alt, C. Kunz, D. Katic, R. Younis, R. Jäkel, B. P. Müller-Stich, M. Wagner, and F. Mathis-Ullrich, "LapSeg3D: Weakly Supervised Semantic Segmentation of Point Clouds Representing Laparoscopic Scenes," in *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, ISSN: 2153-0866, Kyoto, Japan: IEEE, Oct. 2022, pp. 5265–5270, ISBN: 978-1-6654-7927-1. DOI: 10.1109/IROS47612.2022.9981178

B. Alt, D. Katic, R. Jäkel, and M. Beetz, "Heuristic-Free Optimization of Force-Controlled Robot Search Strategies in Stochastic Environments," in *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Kyoto, Japan: IEEE, Oct. 2022, pp. 8887–8893, ISBN: 978-1-6654-7927-1. DOI: 10.1109/IROS47612.2022.9982093 [Online]. Available: https://ieeexplore.ieee.org/document/9982093

2021 B. Alt, D. Katic, R. Jäkel, A. K. Bozcuoglu, and M. Beetz, "Robot Program Parameter Inference via Differentiable Shadow Program Inversion," in *2021 IEEE International Conference on Robotics and Automation (ICRA)*, Xi'an, China: IEEE, May 2021, pp. 4672–4678. DOI: 10.1109/ICRA48506.2021.9561206 [Online]. Available: https://ieeexplore.ieee.org/document/9561206

2020 B. Alt, F. Aumann, L. Gienger, F. Jordan, D. Katic, R. Jäkel, and B. Graf, "Modulare, datengetriebene Roboterprogrammierung für die Lösung komplexer Handhabungsaufgaben in Alltagsumgebungen," in *AAL-Kongress 2020*, Berlin: VDE Verlag, 2020, pp. 17–22, ISBN: 978-3-8007-5342-0. [Online]. Available: http://publica.fraunhofer.de/documents/N-608626.html

Workshop Papers

2025 C. Kienle, B. Alt, O. Arenz, and J. Peters, "HiTAMP: A Hierarchical LLM-Modulo Planner for Feasible Long-Horizon Task and Motion Planning," in *ICRA 2025 Workshop on Language and Semantics of Task and Motion Planning*, Atlanta, USA, 2025.

B. Alt, M. Picklum, S. Arion, F. K. Kenfack, and M. Beetz, "Open, Reproducible and Trustworthy Robot-Based Experiments with Virtual Labs and Digital-Twin-Based Execution Tracing," in *1st IEEE IROS 2025 Workshop on Embodied AI and Robotics for Future Scientific Discovery (AIR4S)*, Hangzhou, China: arXiv, Aug. 2025. DOI: 10.48550/arXiv.2508.11406 arXiv: 2508.11406 [cs].

2021 S. Dittus, B. Alt, A. Hermann, D. Katic, R. Jäkel, and J. Fleischer, "Localization and Tracking of User-Defined Points on Deformable Objects for Robotic Manipulation," in *IEEE ICRA Workshop on Representing and Manipulating Deformable Objects*, arXiv: 2105.09067, Xi'an, China: IEEE, May 2021. [Online]. Available: http://arxiv.org/abs/2105.09067

Manuscripts in Submission

2026 A. Bassiouny, T. Schierenbeck, S. Arion, B. Alt, N. Vasantakumaar, G. Nguyen, and M. Beetz, *Implementing Knowledge Representation and Reasoning with Object Oriented Design*, Jan. 2026. DOI: 10.48550/arXiv.2601.14840 arXiv: 2601.14840 [cs].

2025 C. Kienle, B. Alt, O. Arenz, and J. Peters, *LODGE: Joint Hierarchical Task Planning and Learning of Domain Models with Grounded Execution*, arXiv:2505.13497 [cs], May 2025. DOI: 10.48550/arXiv.2505.13497 [Online]. Available: http://arxiv.org/abs/2505.13497

A. Melnik, B. Alt, G. Nguyen, A. Wilkowski, M. Stefańczyk, Q. Wu, S. Harms, H. Rhodin, M. Savva, and M. Beetz, *Digital Twin Generation from Visual Data: A Survey*, Apr. 2025. DOI: 10.48550/arXiv.2504.13159 arXiv: 2504.13159 [cs].

Awards & Honors

2018-2019 Merit scholarship of the German Acad. Scholarship Foundation (Studienstiftung des deutschen Volkes)

2012-2019 e-fellows Merit Scholarship (Deutsche Telekom, Georg v. Holtzbrinck & McKinsey)

Grants

2026-2028 MATENA innovate! Transfer Project
Digital Twin-based Automated Fiber Placement for Rivet-Free Manufacturing of Aerospace Components (TWINSPACE)
Co-PI

2025-2026 German Academic Exchange Service (DAAD) grant
Digital Twins for Household Autonomous Robots
PI

2024-2026 German Ministry of Education and Research grant #16KIS2236
Resilient, Intelligent Time-Sensitive Networks (RESI-TSN)
Co-PI

2024-2026 German Ministry of Education and Research grant #13GW0735C
Automated Workflow for the Patient-Specific Carbon-Reinforced Orthopedic Products (AutoKOOP)
Co-PI

2023-2026 German Ministry of Education and Research grant #03LB3097A
Continuous Fiber-Reinforced Low-Density Thermoplastic Additive Manuf. (ConfidentAM)
Co-PI (from 10/2024)

2023-2025 German Ministry of Economic Affairs and Climate Action grant #13IK017A
Networked Ditigal Assistant for the Data-Driven Engineering of Robot Workcells (VADER)
PI (from 10/2024), Collaborator

2023-2025 German Ministry of Economic Affairs and Climate Action grant #13IK026A
A Digital and Automated Value Chain for Wiring Harness Manufacturing (Next2OEM)
Co-PI (from 10/2024), Collaborator

2023-2025 German Ministry of Economic Affairs and Climate Action grant #01MD22002B
Efficient Analysis and Control in a Dyn. Edge-Cloud-Continuum for Industr. Production (EASY)
Co-PI (from 10/2024), Collaborator

2022-2025 German Ministry of Economic Affairs and Climate Action grant #01MJ22003B
GANs and Semantics for Resilient, Flexible Robotic Production (GANResilRob)
Co-PI (from 10/2024), Collaborator

2021-2025 German Ministry of Education and Research grant #02L19C255
Competency Center Artificial Intelligence for Working and Living in the Karlsruhe Region (KARL)
Co-PI (from 10/2024), Collaborator

2021-2024 German Ministry of Education and Research grant #13GW0471B
Cognitively Assisted Laparoscopy: A Learning Robotic Assistance System for Surgical Grasping and Holding Tasks (Koala-Grasp)
Collaborator

2021-2023 Baden-Württemberg Ministry for the Economy, Labor and Tourism, InvestBW grant #BW1_0079
Hybrid AI for Flexible Robotic Surface Treatment (RoboGrind)
Collaborator

2020-2023 German Ministry of Education and Research grant #16SV8406
A Multifunctional Service Robot to Support Care Professionals in the Hospital (HoLLiECares)
Collaborator

2021-2024 German Ministry of Education and Research grant #01IS20008C
AI-based Robot Calibration (KIRK)
Collaborator

2019-2022 German Ministry of Education and Research grant #01DR19001B
Imitation Learning from Human Demonstrations in Virtual Reality for Physical Human-Robot Interaction in Assistance Tasks (ILIAS)
Collaborator

2017-2018 German Ministry of Economic Affairs and Energy, ZIM grant #ZF4337302LF7
Frameworks and Technologies for the Monitoring, Analysis and Online Adaption of Industrial Robotic Production Processes (MonRob)
Collaborator

2017-2020 German Ministry of Education and Research grant #16SV7836
Robust Perception Skills for Robotic Household Assistance in the Context of Elderly Care (RoPHa)
Collaborator

2019-2022 German Ministry of Education and Research grant #02L17C556
Proactive Diagnosis and Conception of Collaborative Robot Deployment in Small and Medium-Sized Enterprises (ProBot)
Collaborator

Invited Talks

2026 "Semantic Digital Twins and Virtual Robot Labs for Reproducible, Accessible Scientific Discovery"
3rd Workshop on Accelerating Discovery in Natural Science Laboratories with AI and Robotics
International Conference on Robotics and Automation (ICRA 2026), Vienna, 01.06.2026

"Threat Models & Mitigations from Physical AGI"
Safe AI Germany (SAIGE)
Berlin, 14.04.2026

2025

"Hybrid AI for Safe Embodied Intelligence"
Robotics and Biology (RBO) Lab / Science of Intelligence Excellence Cluster
Technische Universität Berlin, Berlin, 28.11.2025

"Semantic Digital Twins for Robust and Flexible Robot Behavior" (Keynote)
2nd Workshop on Semantic Reasoning and Goal Understanding in Robotics
Robotics Science and Systems Conference (RSS 2025), Los Angeles, 21.06.2025

"World Models 2.0: From Stochastic Parrots to Intelligent Digital Twins"
Symposium Artificial Intelligence
Stuttgart University of Applied Sciences, Stuttgart, 07.05.2025

2024 "Bridging the AI Application Gap in Industrial Robotics with Ontologies and Standards"
3rd Workshop on Ontologies and Standards for Robotics and Automation (WOSRA)
IEEE International Conference on Robotics and Automation (ICRA), Yokohama, 13.05.2024

"GPUs sind das neue Öl: Die KI-Revolution im deutschen Mittelstand erfordert ein Umdenken bei der Bereitstellung kritischer Rechenkapazitäten"
Tag der digitalen Technologien, Fachforum "Generative KI als Schlüssel zur Innovation!? Erfahrungen aus der (Arbeits-)Praxis"
German Ministry for Economic Affairs and Climate Action, Berlin, 8.10.2024

"Verständlich, Sicher, Beherrschbar: Hybride KI für industrielle Anwendungen"
Innovative Arbeitswelten im Mittelstand
Projektträger Karlsruhe (PTKA) at Karlsruhe Institute of Technology (KIT), Karlsruhe, 20.09.2024

"Ein interaktiver KI-Assistent für die Refabrikation mit Robotern: Datensparsam und flexibel dank hybrider KI"
KI-Showroom-Insight: KI und Produktion
FZI Research Center for Information Technology, Karlsruhe, 27.06.2024

"What's in Your Head? Neurosymbolic AI for Intelligent Robots that we Understand" (Keynote)
e-fellows IT Day
ZEIT Verlagsgruppe, McKinsey & Company Inc, Stuttgart, 26.04.2024

2023 "Intelligente Programmierassistenten für die industrielle Robotik"
Revolution der Robotik: Lösungen aus Baden-Württemberg
German Chamber of Commerce and Industry (IHK), Karlsruhe, 13.07.2023

Conference Activity

Papers Presented

2025 "Shadow Program Inversion with Differentiable Planning: A Framework for Unified Robot Program Parameter and Trajectory Optimization", IEEE International Conference on Robotics and Automation (ICRA), May 19-32

2024 "RoboGrind: Intuitive and Interactive Surface Treatment with Industrial Robots", IEEE International Conference on Robotics and Automation (ICRA), May 13-17

"Human-AI Interaction in Industrial Robotics: Design and Empirical Evaluation of a User Interface for Explainable AI-Based Robot Program Optimization", 57th CIRP Conference on Manufacturing Systems (CMS), May 29-31

"BANSAI: Towards Bridging the AI Adoption Gap in Industrial Robotics with Neurosymbolic Programming", 57th CIRP Conference on Manufacturing Systems (CMS), May 29-31

"Domain-Specific Fine-Tuning of Large Language Models for Interactive Robot Programming", European Robotics Forum (ERF), March 13-15

2023 "EfficientPPS: Part-aware Panoptic Segmentation of Transparent Objects for Robotic Manipulation", 56th International Symposium on Robotics (ISR Europe), September 26-27

"Knowledge-Driven Robot Program Synthesis from Human VR Demonstrations", 20th International Conference on Principles of Knowledge Representation and Reasoning (KR), September 2-8

2022 "LapSeg3D: Weakly Supervised Semantic Segmentation of Point Clouds Representing Laparoscopic Scenes", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October 23-27

"Heuristic-Free Optimization of Force-Controlled Robot Search Strategies in Stochastic Environments", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October 23-27

"Localization and Tracking of User-Defined Points on Deformable Objects for Robotic Manipulation", IEEE ICRA Workshop on Representing and Manipulating Deformable Objects, May 19

"Robot Program Parameter Inference via Differentiable Shadow Program Inversion", IEEE International Conference on Robotics and Automation (ICRA), May 30 - Jun 5

2020 "Modulare, datengetriebene Roboterprogrammierung für die Lösung komplexer Handhabungsaufgaben in Alltagsumgebungen", AAL-Kongress, September 29 - October 1

Invited Talks

2026 "Semantic Digital Twins and Virtual Robot Labs for Reproducible, Accessible Scientific Discovery"
3rd Workshop on Accelerating Discovery in Natural Science Laboratories with AI and Robotics, International Conference on Robotics and Automation (ICRA), June 1, 2026

2025 "Semantic Digital Twins for Robust and Flexible Robot Behavior", 2nd Workshop on Semantic Reasoning and Goal Understanding in Robotics (SemRob), Robotics Science and Systems Conference (RSS), June 21, 2025

2024 "Bridging the AI Application Gap in Industrial Robotics with Ontologies and Standards", 3rd Workshop on Ontologies and Standards for Robotics and Automation (WOSRA), IEEE International Conference on Robotics and Automation (ICRA), May 13, 2024

Other Talks

2025 "The AICOR Virtual Research Building: Collaborative, Open Science and Education in the Cloud", IEEE International Conference on Robotics and Automation (ICRA), May 20

"The AICOR Virtual Research Building: Collaborative Robotics in the Cloud", ROSCon UK, September 17

Departmental Talks

2025 "Hybrid AI for Safe Embodied Intelligence"
Center for Human-Compatible AI (CHAI)
University of California, Berkeley, 23.07.2025

2024 "Neurosymbolic Robot Programming: Bridging the Gap between Safe and Capable Robot Intelligence"
2024 EASE Fall School
University of Bremen/University of Michigan, Bremen, 13.11.2024

2022 "Knowledge Representation and Reasoning in Industrial Robotics"
2022 EASE Fall School
University of Bremen, 23.09.2022

Teaching

Guest Lectures

2025 "AI-Enabled Robot Programming: Intuitive, Safe Human-Robot Interaction via Learning and Planning"
Robotik / Robotics
Stuttgart University for Applied Sciences, 17.01.2025

"AI-Enabled Robot Programming: Intuitive, Safe Human-Robot Interaction via Learning and Planning"
Künstliche Intelligenz in der Produktion / Artificial Intelligence in Industrial Production
wbk Institute for Production Science, Karlsruhe Institute for Technology, 31.01.2025

Research Experience

2020-2025 Model-based first-order robot program optimization with neural digital twins
Led research endeavor spanning 6 publicly funded research projects to develop the foundations of learned, modular, differentiable forward models of robot and environment dynamics, and their use in model-based robot program optimization.

2022-2025 Interactive, natural-language robot program synthesis
Led research endeavor spanning 4 publicly funded research projects to develop an AI assistant capable of synthesizing robot programs for complex, long-horizon tasks through natural-language dialogue with human users.

Service to the Profession

Workshop Organization

2026 Co-Organizer, Hands-On Workshop "AI-Based Robotics in the Cloud with the Virtual Research Building (VRB)", IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM), Genova, Italy

Editorial Service

2026 Associate Editor, IEEE/SICE International Symposium on System Integration (SII)

Reviewing

Conferences: IEEE ICRA, IEEE/RSJ IROS, IEEE CASE, KR, IJCAI, IEEE/ASME AIM
Journals: IEEE Robotics and Automation Lettes (RA-L), KI - Künstliche Intelligenz

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