

Till Hofmann



Education

- 09/23 **PhD**, *Computer Science*, RWTH Aachen University
Supervisor: Prof. Gerhard Lakemeyer, PhD
Grade: *summa cum laude*
Thesis: *Towards Bridging the Gap between High-Level Reasoning and Execution on Robots*
- 04/15 - 03/17 **Master of Science**, *Computer Science*, RWTH Aachen University, minor: Physics.
Grade: 1.2
Thesis: *Generating Macro Actions from a Plan Database for Planning on Mobile Robots*
- 10/11 - 03/15 **Bachelor of Science**, *Computer Science*, RWTH Aachen University, minor: Physics
Grade: 1.6. Thesis:
Continual Planning and Execution Monitoring in the Agent Language Golog on a Mobile Robot
- 09/08 - 06/10 **Abitur**, *Kepler-Gymnasium*, Tübingen, majors: Computer Science, Physics
Grade: 1.0
- 08/07 - 07/08 **High School**, *Attica Central School*, Attica, NY, USA
Student exchange year with AFS Intercultural Programs

Research Experience

- since 04/23 **Postdoctoral Researcher**, *Chair for Machine Learning and Reasoning*, RWTH
– ERC project on *Representation Learning for Acting and Planning*
– Combining learning and planning methods for high-level reasoning with a focus on robotics
- 04/17 - 03/23 **Doctoral Researcher**, *Knowledge-Based Systems Group*, RWTH
– DFG project on *Constraint-based Transformations of Abstract Task Plans into Executable Actions for Autonomous Robots*
– Associate of the DFG research training group (“Graduiertenkolleg”) *Uncertainty and Randomness in Algorithms, Verification, and Logic (UnRAVeL)*
- 07/20 - 10/20 **Robotics Intern**, *X, the moonshot factory*, Munich, <https://intrinsic.ai>
Worked on task planning and high-level behavior control for industrial robots
- 04/17 - 06/20 **Team Lead**, *Carologistics*, RWTH, RoboCup Logistics League
– Coordinated a team of 10 students and researchers from RWTH and FH Aachen
– Lead the development of a software framework for a multi-agent logistics robot scenario
– Successfully participated in three national and three international RoboCup competitions
- 10/18 - 01/19 **Visiting Researcher**, *Artificial Intelligence and its Applications Institute (AIAI)*, *University of Edinburgh*, Belle Lab
Worked with Dr. Vaishak Belle on abstraction of noisy robot programs
- 10/15 - 03/16 **Autonomous Driving Intern**, *Mercedes-Benz Research & Development North America*, Sunnyvale, CA, USA, Team Vehicle Intelligence
Improved trajectory planning for self-driving cars
- 01/13 - 03/17 **Student Research Assistant**, *Knowledge-Based Systems Group*, RWTH

Teaching Experience

- Summer 2024 **Instructor**, *Causal Inference*, Proseminar, *planned*
- Conceptualize and implement a new undergraduate seminar (proseminar)
 - Teach basics of academic writing and presenting
 - Assist students in preparing reports and presentations
- Summer 2024 **Teaching Assistant**, *Actions and Planning in AI: Learning, Models, and Algorithms*, Master's course, *planned*
- Prepare and mark weekly exercises and present their solutions
 - Prepare and grade written exams
- Winter 2023 **Teaching Assistant**, *Social and Technological Change*, Master's course
- Assisted students in preparing reports and presentations
 - Graded student presentations
 - Developed an algorithm for topic and group assignment according to student preferences
- Summer 2023 **Teaching Assistant**, *Actions and Planning in AI: Learning, Models, and Algorithms*, Master's course
- Assisted in the conceptualization and implementation of a new course
 - Prepared and marked weekly exercises and presented their solutions
 - Prepared and graded written exams
- Summer 2021 **Teaching Assistant**, *The Logic of Knowledge Bases*, Master's course
- Prepared and marked bi-weekly exercises and presented their solutions
 - Assisted in oral exams
- Winter 2020 **Teaching Assistant**, *Centralized Goal Reasoning for Logistics Robots*, Lab course
- Adapted a research project to be suitable for students
 - Assisted students in implementing new strategies in a multi-robot scenario
- Summer 2020 **Teaching Assistant**, *Uncertainty in Robotics*, Master's course
- Assisted in the conceptualization and implementation of a new course
 - Prepared and marked bi-weekly exercises and presented their solutions
 - Assisted in oral exams
- Winter 2019 **Teaching Assistant**, *High-Level Agent Programming for Logistics Robots*, Lab course
- Adapted a research project to be suitable for students
 - Assisted students in implementing a high-level agent in a logistics robots scenario
- Summer 2019 **Lecturer**, *Robotics for Future Industrial Applications*, Summer school
- Responsible for 1 week (40h) of a 3-week intensive course
 - Taught basics of robotics, including localization, navigation, reasoning
 - Designed programming exercises to familiarize students with a robotics framework
- Summer 2018 **Lecturer**, *Robotics for Future Industrial Applications*, Summer school, (as above)
- Summer 2018 **Teaching Assistant**, *Reasoning, Planning, and Scheduling with Uncertainty*, Seminar
- Selected seminar topics suitable for Master's students
 - Assisted students in preparing reports and presentations
 - Graded student presentations and final reports
- Winter 2017 **Teaching Assistant**, *Robust Planning and Execution for Logistics Robots*, Lab course
- Adapted a research project to be suitable for students
 - Assisted students in implementing execution strategies in a logistics robots scenario
- Summer 2017 **Lecturer**, *Robotics for Future Industrial Applications*, Summer school, (as above)
- Summer 2017 **Teaching Assistant**, *Selected Topics on Planning and Plan Execution for Robotics Systems*, Seminar, (as above)

Scholarships & Awards

- 01/23 **ICT Young Researcher Award**, 1st prize, Profile Area *Information and Communication Technologies*, RWTH Aachen University
- 12/21 **Best Tool Paper Award**, “TACoS: A Tool for MTL Controller Synthesis”, 19th International Conference on Software Engineering and Formal Methods
- 07/19 **World Champion**, *RoboCup Logistics League*, Team Carologistics
- 05/19 **National Champion**, *RoboCup German Open Logistics League*, Team Carologistics
- 10/18 - 01/19 **Research Scholarship**, *German Academic Exchange Service (DAAD)*
- 05/18 **National Champion**, *RoboCup German Open Logistics League*, Team Carologistics
- 09/17 **Springorum Denkmünze**, *RWTH Aachen University*
- 07/17 **World Champion**, *RoboCup Logistics League*, Team Carologistics
- 05/17 **National Champion**, *RoboCup German Open Logistics League*, Team Carologistics
- 10/16 - 03/17 **Dean’s List**, *RWTH Aachen University*
- 10/16 - 03/17 **Deutschlandstipendium**, *Miltenyi Biotec*
- 10/15 - 09/16 **Deutschlandstipendium**, *IBM Germany*
- 06/10 **DPG-Buchpreis**, *German Physical Society (DPG)*

Grants

- 2022 **Data Evaluation and Agent Simulations with the Logistics League Referee Box**, *RoboCup Foundation*, 5000 EUR
 - Funding for a student research assistant
 - Co-authored the project proposal
- 2021 **AIStudyBuddy**, *Bundesministerium für Bildung und Forschung (BMBF)*, total project volume: 3.9 Mio EUR
 - Assisted in the project conceptualization
- 2020 **A Web Front-End for the Logistics League Referee Box**, *RoboCup Foundation*, 5000 EUR
 - Funding for two student research assistants
 - Lead author of the project proposal and main project coordinator
- 2019 **Workpiece Tracking and Networking Robustness for the Logistics League**, *RoboCup Foundation*, 6000 EUR
 - Funding for a student research assistant and hardware
 - Lead author of the project proposal and main project coordinator

Committees & Other Activities

- Journal Rev. Artificial Intelligence Journal (AIJ) (2023), Robotics and Autonomous Systems (2022)
- PC Member KR’24, IJCAI’24, ICAPS’24, AAAI’24, KR’23, IJCAI’23, ICAPS’23, AAAI’23, IJCAI’22, AAAI’22, IROS’21, IJCAI’21, AAAI’21
- RoboCup Member of the RoboCup Logistics League Technical Committee 2017-2020
Chair of the RoboCup Logistics League Technical Committee 2018-2019

Invitation-Only Research Seminars

- 2024 **Trustworthiness and Responsibility in AI – Causality, Learning, and Verification**, *Schloss Dagstuhl – Leibniz Center for Informatics*

Invited Talks

Hofmann, Till (2022). “Machine Learning – Eine Standortbestimmung”. Invited Talk. DGN-Kongress (Deutsche Gesellschaft für Neurologie).

Journal Publications

Hofmann, Till and Stefan Schupp (Jan. 1, 2023). “Controlling Timed Automata against MTL Specifications with TACoS”. In: *Science of Computer Programming* 225, p. 102898.

Conference Publications

Hofmann, Till and Vaishak Belle (2023). “Abstracting Noisy Robot Programs”. In: *Proceedings of the 22nd International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*.

Habering, Daniel, Till Hofmann, and Gerhard Lakemeyer (2021). “Using Platform Models for a Guided Explanatory Diagnosis Generation for Mobile Robots”. In: *Proceedings of the 30th International Joint Conference on Artificial Intelligence (IJCAI)*.

Hofmann, Till and Stefan Schupp (2021). “TACoS: A Tool for MTL Controller Synthesis”. In: *Proceedings of the 19th International Conference on Software Engineering and Formal Methods (SEFM)*.

Hofmann, Till, Tarik Viehmann, Mostafa Gomaa, Daniel Habering, Tim Niemueller, and Gerhard Lakemeyer (2021). “Multi-Agent Goal Reasoning with the CLIPS Executive in the RoboCup Logistics League”. In: *Proceedings of the 13th International Conference on Agents and Artificial Intelligence (ICAART)*.

Mataré, Victor, Tarik Viehmann, Till Hofmann, Gerhard Lakemeyer, Alexander Ferrein, and Stefan Schiffer (2021). “Portable High-Level Agent Programming with Golog++”. In: *Proceedings of the 13th International Conference on Agents and Artificial Intelligence (ICAART)*.

Viehmann, Tarik, Till Hofmann, and Gerhard Lakemeyer (2021). “Transforming Robotic Plans with Timed Automata to Solve Temporal Platform Constraints”. In: *Proceedings of the 30th International Joint Conference on Artificial Intelligence (IJCAI)*.

Hofmann, Till, Tim Niemueller, and Gerhard Lakemeyer (2020). “Macro Operator Synthesis for ADL Domains”. In: *Proceedings of the 24th European Conference on Artificial Intelligence (ECAI)*.

Hofmann, Till, Nicolas Limpert, Victor Mataré, Alexander Ferrein, and Gerhard Lakemeyer (2019). “Winning the RoboCup Logistics League with Fast Navigation, Precise Manipulation, and Robust Goal Reasoning”. In: *RoboCup 2019: Robot World Cup XXIII*.

Niemueller, Tim, Till Hofmann, and Gerhard Lakemeyer (2019). “Goal Reasoning in the CLIPS Executive for Integrated Planning and Execution”. In: *Proceedings of the 29th International Conference on Automated Planning and Scheduling (ICAPS)*.

Hofmann, Till, Victor Mataré, Tobias Neumann, Sebastian Schönitz, Christoph Henke, Nicolas Limpert, Tim Niemueller, Alexander Ferrein, Sabina Jeschke, and Gerhard Lakemeyer (2018). “Enhancing Software and Hardware Reliability for a Successful Participation in the RoboCup Logistics League 2017”. In: *RoboCup 2017: Robot World Cup XXI*.

Hofmann, Till, Tim Niemueller, and Gerhard Lakemeyer (2017). “Initial Results on Generating Macro Actions from a Plan Database for Planning on Autonomous Mobile Robots”. In: *Proceedings of the 27th International Conference on Automated Planning and Scheduling (ICAPS)*.

Hofmann, Till, Tim Niemueller, Jens Claßen, and Gerhard Lakemeyer (2016). “Continual Planning in Golog”. In: *Proceedings of the 30th Conference on Artificial Intelligence (AAAI)*.

Workshop Publications

- Hofmann, Till and Vaishak Belle (2022). “Using Abstraction for Interpretable Robot Programs in Stochastic Domains”. In: *KR Workshop on Explainable Logic-Based Knowledge Representation (XLoKR)*.
- Swoboda, Daniel, Till Hofmann, Tarik Viehmann, and Gerhard Lakemeyer (2022). “Towards Using Promises for Multi-Agent Cooperation in Goal Reasoning”. In: *ICAPS Workshop on Planning and Robotics (PlanRob)*.
- Mataré, Victor, Stefan Schiffer, Alexander Ferrein, Tarik Viehmann, Till Hofmann, and Gerhard Lakemeyer (2020). “Constraint-Based Plan Transformation in a Safe and Usable GOLOG Language”. In: *IROS Workshop on Bringing Constraint-Based Robot Programming to Real-World Applications (CobaRoP)*.
- Hofmann, Till and Gerhard Lakemeyer (2018). “A Logic for Specifying Metric Temporal Constraints for Golog Programs”. In: *Proceedings of the 11th Cognitive Robotics Workshop 2018 (CogRob)*.
- Hofmann, Till, Victor Mataré, Stefan Schiffer, Alexander Ferrein, and Gerhard Lakemeyer (2018). “Constraint-Based Online Transformation of Abstract Plans into Executable Robot Actions”. In: *AAAI Spring Symposium: Integrating Representation, Reasoning, Learning, and Execution for Goal Directed Autonomy*.
- Niemueller, Tim, Till Hofmann, and Gerhard Lakemeyer (2018). “CLIPS-based Execution for PDDL Planners”. In: *ICAPS Workshop on Integrated Planning, Acting, and Execution (IntEx)*.

Poster Presentations

- Hofmann, Till, Stefan Schupp, and Gerhard Lakemeyer (2022). “Controlling Golog Programs against MTL Constraints”. Poster. Dagstuhl Seminar on Cognitive Robotics.
- Hofmann, Till and Gerhard Lakemeyer (2020). “Controller Synthesis for Golog Programs over Finite Domains with Metric Temporal Constraints”. Poster. 17th International Conference on Principles of Knowledge Representation and Reasoning. arXiv: 2102.09837.

Articles under Review

- Hofmann, Till and Hector Geffner (2024). “Learning Generalized Policies for Fully Observable Non-Deterministic Planning Domains”. Submitted to IJCAI’24.

Thesis Supervision

- Swoboda, Daniel (Mar. 2024). “Learning Skill Execution and Domain Grounding for Integrated Robot Task and Motion Planning”. Primary advisor. Master’s Thesis.
- Ginter, Sonja (Apr. 2023). “Using Reinforcement Learning as Goal Selector in Goal Reasoning”. Secondary advisor. Master’s Thesis.
- Meer, Anna-Maria (July 2022). “An Approach to Instance Segmentation and Pose Estimation for Automated Dismantling of Lithium-Ion Batteries for High-Quality Recycling”. Secondary advisor. Master’s Thesis.
- Tschesche, Matteo (May 2022). “Whole-Body Manipulation on Mobile Robots Using Parallel Position-Based Visual Servoing”. Primary advisor. Master’s Thesis.
- Doychev, Ivaylo (Oct. 2021). “Goal Reasoning with the CLIPS Executive in ROS2”. Secondary advisor. Bachelor’s Thesis.
- Gomaa, Mostafa (Aug. 2020). “Centralized Goal Reasoning and Scheduling Using Mixed Integer Programming for Logistics Robots”. Primary advisor. Master’s Thesis.
- Habering, Daniel (Aug. 2019). “Using Platform Models for a Guided Explanatory Diagnosis Generation for Mobile Robots”. Primary advisor. Master’s Thesis.
- Viehmann, Tarik (Dec. 2019). “Transforming Robotic Plans with Timed Automata to Solve Temporal Platform Constraints”. Primary advisor. Master’s Thesis.