

MARKUS KNAUER

Munich, Germany • markusknauer.github.io • [Google Scholar](#) • [GitHub](#) • [LinkedIn](#)

PROFESSIONAL SUMMARY

Research Scientist, Teaching Assistant and Ph.D. candidate at DLR / TUM with 5+ years of experience in robot learning, machine learning, and computer vision. First author on 7 peer-reviewed publications in top venues (RA-L, ICRA, IROS, CoRL). Co-developer of BlenderProc, an open-source rendering pipeline with 3,300+ GitHub stars. Seeking to apply deep expertise in interactive robot learning, foundation models, and human-robot interaction to applied ML/AI research in industry.

PROFESSIONAL EXPERIENCE

- 11/2020 – Present **Research Scientist**, German Aerospace Center (**DLR**), Institute of Robotics and Mechatronics, Department: Cognitive Robotics, Oberpfaffenhofen, Germany.
- Led research on **interactive, incremental robot skill learning and adaptation** using **machine learning** and **foundation models**. Published 7 first-author papers in top venues (RA-L, ICRA, IROS, CoRL). Developed [IROSA](#), [MOMO](#), and [CLASP](#) frameworks for natural-language-driven robot skill adaptation, deployed on **real robotic** platforms.
- 2023–2025: **Elected PhD Speaker** representing ~80 doctoral researchers across the Institute.
- 10/2024 – Present **Teaching Assistant** for **Machine Learning in Robotics**, CIT, Technical University of Munich (**TUM**), Germany with Prof. Dr. Alin Albu-Schäffer.
- 11/2019 – 08/2020 Working student, German Aerospace Center (DLR), Institute of Robotics and Mechatronics, Department: Perception and Cognition, Oberpfaffenhofen, Germany.
- Developed computer vision and deep learning solutions for robotic perception. Designed neural network architectures for online learning applications.
- Co-developed [BlenderProc](#), an **open-source** photorealistic rendering pipeline (**3,300+ GitHub stars**, published at **RSS 2020** and **JOSS 2023**).
- 08/2017 – 01/2018 Working Student, Industrie 4.0, Robert Bosch GmbH, Germany.
- 09/2016 – 02/2017 Working Student, IT-Project Management Endress+Hauser Wetzler GmbH + Co. KG, Nesselwang, Germany.
- 09/2011 – 09/2014 Business Administration Apprenticeship (HR, Accounting, IT) at Sensor-Technik Wiedemann GmbH, Kaufbeuren, Germany.

EDUCATION

- 11/2020 – Present Doctoral candidate/**Ph.D.** (Dr. rer. nat.) in **Computer Science**, Major: **Machine Learning**, Artificial Intelligence, TUM School of Computation, Information and Technology (CIT), Technical University of Munich (**TUM**), Germany with Prof. Dr.-Ing. Alin Albu-Schäffer.

- 10/2018 – 09/2020 **Master** of Science in Computer Science, Kempten University of Applied Sciences. Major: Data Science, Germany. **GPA: 4.0/4.0 (top of class).**
- 02/2018 – 07/2018 **Semester abroad** — Diploma in Business, University of the Sunshine Coast (USC), Australia. Major: Data Science, IT, International Business
- 10/2014 – 07/2018 **Bachelor** of Science in Information Systems, Kempten University of Applied Sciences, Germany. **GPA: 4.0/4.0 (top of class).**

TECHNICAL SKILLS

- Programming: Python (5+ years), C++, Java, Bash
- ML / Robotics: PyTorch, TensorFlow, scikit-learn, ROS/ROS2, LLM/VLM integration, reinforcement learning, imitation learning
- Tools: LaTeX, Git, Jenkins, CI/CD, Docker, Linux, Blender, PyCharm, VS Code
- Research Areas: Robot learning, human-robot interaction, multimodal interactive skill learning, machine learning, foundation models (LLM/VLM/VLA), sim-to-real transfer, continual learning, computer vision

PUBLICATIONS

- 2026 [under review]: Knauer, M., Gieraths, V., Mai, Tai., Bustamante, S., Albu-Schäffer, A., Stulp, F., Silvério, J. "**CLASP**: Reliable Robot Skill Selection, Parametrization, Combination and Active Acquisition using VLM and Machine Learning, applied on real robot (title changed because of double-blind process)"
- 2026 Knauer, M., Fiorini, E., Mühlbauer, M., Schneyer, S., Angsuratanawech, P., Lay, F. S., Bachmann, T., Bustamante, S., Nottensteiner, K., Stulp, F., Albu-Schäffer, A., Silvério, J., Eiband, T. "**MOMO**: A framework for seamless physical, verbal, and graphical robot skill learning and adaptation" <https://doi.org/10.48550/arXiv.2604.20468>
- 2026 Knauer, M., Bustamante, S., Eiband, T., Albu-Schäffer, A., Stulp, F., Silvério, J. "**IROSA**: Interactive Robot Skill Adaptation using Natural Language" in IEEE Robotics and Automation Letters (RA-L); vol. 11, no 4, pp. 5246-5253, April 2026, <https://doi.org/10.1109/LRA.2026.3671560>
- 2025 Knauer, M., Albu-Schäffer, A., Stulp, F., Silvério, J. "Interactive incremental learning of generalizable skills with local trajectory modulation", in IEEE Robotics and Automation Letters (RA-L), vol. 10, no. 4, pp. 3398-3405, April 2025, (also in 2024 CoRL Workshops) <https://doi.org/10.1109/LRA.2025.3542209>
- 2025 Bustamante, S., Knauer, M., Thun, J., Schneyer, S., Albu-Schäffer, A., Weber, B., Stulp, F. "Grounding Embodied Question-Answering with State Summaries from Existing Robot Modules" in 2025 IEEE International Conference on Robotics and Automation (ICRA), (also in 2024 RSS Workshops) <https://doi.org/10.1109/ICRA55743.2025.11127843>
- 2024 Ding, J., Kessler, I., Perzylo, A., Knauer, M., et al. "Intuitive Instruction of Robot Systems: Semantic Integration of Standardized Skill Interfaces" in 2024 IEEE International Conference on Industrial Informatics (INDIN), <https://doi.org/10.1109/INDIN58382.2024.10774421>

- 2024 Fiorini, E., Knauer, M., Silvério, J. "Human-intention-aware skill modulation using energy tanks for collaborative tasks" in IEEE Robotics and Automation Letters (RA-L); vol. 11, no 5, pp. 5366-5373, May 2026, <https://doi.org/10.1109/LRA.2026.3671561>
- (also in 2024 Conference on Robot Learning (CoRL) Workshops. <https://openreview.net/pdf?id=3CUwINKW36>)
- 2023 Denninger, M., Winkelbauer, D., Sundermeyer, M., Boerdijk, W., Knauer, M., Strobl, K., Humt, M., Triebel, R. "BlenderProc2: A procedural pipeline for photorealistic rendering" in 2023 Journal of Open Source Software (JOSS). <https://joss.theoj.org/papers/10.21105/joss.04901>
- 2022 Knauer, M., Denninger, M., Triebel, R. "Recall: Rehearsal-free continual learning for object classification" in 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). <https://doi.org/10.1109/IROS47612.2022.9981968>
- 2022 Knauer, M., Denninger, M., Triebel, R., "HOWS-CL-25: Household Objects Within Simulation Dataset for Continual Learning" Zenodo. <https://doi.org/10.5281/zenodo.7189434>
- 2020 Denninger, M., Sundermeyer, M., Winkelbauer, D., Olefir, D., Hodan, T., Zidan Y., Elbadrawy, M., Knauer, M., Katam, H., Lodhi, A. "BlenderProc: Reducing the Reality Gap with Photorealistic Rendering" in 2020 Robotics: Science and Systems (RSS) Workshops. <https://elib.dlr.de/139317/>