

# NILS BLANK

[nils.blank@kit.edu](mailto:nils.Blank@kit.edu) | [nilsblank.github.io](https://nilsblank.github.io) | [Google Scholar](#)

Ph.D. researcher studying how spatial and temporal representations enable generalization in robot manipulation and embodied reasoning. I also investigate efficient, scalable methods for deriving supervision from robot demonstrations and VLM architectures for learning these representations.

## RESEARCH EXPERIENCE

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Ph.D. Researcher, Karlsruhe Institute of Technology (KIT)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Jul. 2024 – Present       |
| <i>Foundation Models for Robotics (Advisor: Prof. Rudolf Lioutikov)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <i>Karlsruhe, Germany</i> |
| <ul style="list-style-type: none"><li><b>SPARC (CoRL 2026)</b>: Developed a risk-aware spatial annotation pipeline using phase-aligned motion and gripper proximity to identify manipulated objects and estimate annotation reliability.</li><li>Processed <b>280k trajectories</b>; retained <b>167k at a target precision of 95%</b>, versus 30k using detector confidence, and generated <b>511k VQA samples</b> for embodied VLM training.</li><li>Introduced <b>IA-Bench</b>, an interaction-aware object-grounding benchmark spanning <b>1.7k demonstrations and 12 embodiments</b>.</li><li>Fine-tuned Qwen3.5-4B, achieving <b>71.0% on Where2Place</b> versus 53.0% with detector-filtered supervision. SPARC-trained policies achieved <b>31% vs. 9%</b> success for a no-reasoning baseline (100 rollouts per method, 10 real-world tasks).</li><li><b>NILS (CoRL 2024)</b>: Developed a zero-shot pipeline that segmented and annotated <b>115k+ robot trajectories</b> from over 430 hours of robot data with natural-language instructions, without manual instruction labeling.</li><li>Set up a <b>ROS 2-based bimanual Franka system</b> for real-robot data collection and policy evaluation.</li></ul> |                           |

## SELECTED PUBLICATIONS

|                                                                                                                                                                                                     |                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>SPARC: Reliable Spatial Annotations from Robot Demonstrations at Scale</b> , CoRL 2026                                                                                                           | <i>First author</i> |
| Nils Blank, Paul Mattes, Maximilian Xiling Li, Jakub Suliga, Thomas Roth, Moritz Reuss, Pankhuri Vanjani, Rudolf Lioutikov                                                                          |                     |
| <b>Scaling Robot Policy Learning via Zero-Shot Labeling with Foundation Models</b> , CoRL 2024                                                                                                      | <i>First author</i> |
| Nils Blank, Moritz Reuss, Marcel Rühle, Ömer Erdiñç Yağmurlu, Fabian Wenzel, Oier Mees, Rudolf Lioutikov                                                                                            |                     |
| <b>SIR: Structured Image Representations for Explainable Robot Learning</b> , CVPR 2026                                                                                                             |                     |
| Paul Mattes, Jan Schwab, Jens Bosch, Maximilian Xiling Li, <b>Nils Blank</b> , Minh-Trung Tang, Moritz Haberland, Rudolf Lioutikov                                                                  |                     |
| <i>Contribution: supported real-world robot deployment and representation sparsification.</i>                                                                                                       |                     |
| <b>BEAST: Efficient Tokenization of B-Splines Encoded Action Sequences for Imitation Learning</b> , NeurIPS 2025                                                                                    |                     |
| Hongyi Zhou, Weiran Liao, Xi Huang, Yucheng Tang, Fabian Otto, Xiaogang Jia, Xinkai Jiang, Simon Hilber, Ge Li, Qian Wang, Ömer Erdiñç Yağmurlu, <b>Nils Blank</b> , Moritz Reuss, Rudolf Lioutikov |                     |
| <i>Contribution: helped set up the training framework and VLM backbone integration.</i>                                                                                                             |                     |

## INDUSTRY EXPERIENCE

|                                                                                                                                                           |                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Working Student, SAP Security Research</b>                                                                                                             | Nov. 2022 – Sep. 2023     |
| <i>SAP Research (Advisor: Dr. Tom Ganz)</i>                                                                                                               | <i>Karlsruhe, Germany</i> |
| <ul style="list-style-type: none"><li>Researched code anonymization and privacy-preserving code generation with large language models.</li></ul>          |                           |
| <b>Working Student, Data Science &amp; Artificial Intelligence</b>                                                                                        | Mar. 2021 – Mar. 2022     |
| <i>1&amp;1 IONOS SE</i>                                                                                                                                   | <i>Karlsruhe, Germany</i> |
| <ul style="list-style-type: none"><li>Evaluated unsupervised and deep learning methods for webspace categorization and document classification.</li></ul> |                           |

## EDUCATION

|                                                                                                                       |                           |
|-----------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Karlsruhe Institute of Technology (KIT)</b>                                                                        | 2020 – 2024               |
| <i>M.Sc. in Computer Science, Study Profile: Artificial Intelligence</i>                                              | <i>Karlsruhe, Germany</i> |
| <ul style="list-style-type: none"><li>Exchange semester at Universitat Politècnica de Catalunya, Barcelona.</li></ul> |                           |
| <b>Eberhard Karls University of Tübingen</b>                                                                          | 2017 – 2020               |
| <i>B.Sc. in Media Informatics</i>                                                                                     | <i>Tübingen, Germany</i>  |

## TECHNICAL SKILLS

**ML / Robotics**: PyTorch, TensorFlow, VLM fine-tuning, ROS 2, vLLM, SLURM, multi-GPU training  
**Programming**: Python, C++, R, MATLAB, Java

## AWARDS & SERVICE

**Best Extended Abstract Award**: RSS Lab2Production Workshop.  
**Outstanding Reviewer**: LEAP Workshop, 2024.  
**Reviewer**: CoRL, ICLR, NeurIPS, IEEE T-RO.  
**Supervision**: Student theses and research projects at KIT.