

Lukas Hermann

MACHINE LEARNING · DATA SCIENCE · DRUG DISCOVERY

Berlin, Germany

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| [lukas-c-hermann](https://github.com/lukas-c-hermann) | [Google Scholar](https://scholar.google.com/citations?user=...)



Experience

Machine Learning & Cheminformatics Intern

Berlin, Germany

PANGEA BIO

Feb. 2023 - Feb. 2024

- Benchmarking machine learning models and molecular fingerprints for chemical activity prediction using RDKit.
- Fine-tuning Llama2 and prompt engineering of LLMs for medical entity and relationship extraction from ethnobotanical literature.
- Integration of heterogeneous data sources such as ethnobotany, natural product datasets, and bioactivity databases like PubChem and ChEMBL and implementation of analysis workflow to prioritize potential compound-target pairs.
- Building docker images and cloud deployment on AWS, Lambda Labs and Vast.ai.

PhD Candidate

Freiburg, Germany

AUTONOMOUS INTELLIGENT SYSTEMS LAB, UNIVERSITY OF FREIBURG

Feb. 2020 - Apr. 2022

- Machine learning research for robot manipulation.
- Created a benchmark, dataset and state-of-the-art Transformer-based architecture for learning language-conditioned robot control policies from unstructured data.
- Optimized data loading and distributed training on high-performance SLURM cluster.
- Developed a Python framework for the fast design of platform-independent robot experiments.
- Implemented robot control on three different robots (KUKA iiwa, Franka Emika Panda, UR3).

Research Assistant

Freiburg, Germany

AUTONOMOUS INTELLIGENT SYSTEMS LAB, UNIVERSITY OF FREIBURG

Sep. 2019 - Jan. 2020

- Designed and implemented curriculum learning strategies for deep reinforcement learning based on Proximal Policy Optimization.
- Successfully applied the algorithm to solve real-world robot manipulation tasks with KUKA iiwa.

Student Research Assistant

Freiburg, Germany

AUTONOMOUS INTELLIGENT SYSTEMS LAB, UNIVERSITY OF FREIBURG

2015, 2016

- Trained a mouth detection system for robotics applications.
- Created a dataset of 3D-reconstructed household objects for robot manipulation (for tracking and training in simulation).

Education

M.Sc. in Computer Science (GPA 4.0)

Freiburg, Germany

ALBERT LUDWIG UNIVERSITY OF FREIBURG

Oct. 2015 - Jun. 2019

- Minor: Cognitive Science
- Specialization: Machine Learning, Computer Vision, Robotics, Data Science
- Thesis: Adaptive Curriculum Generation from Demonstrations (advised by Prof. Dr. Wolfram Burgard)
- Erasmus semester at Sapienza University of Rome, Italy

B.Sc. in Computer Science (GPA 3.8)

Freiburg, Germany

ALBERT LUDWIG UNIVERSITY OF FREIBURG

Oct. 2011 - Sep. 2015

- Minor: Cognitive Science
- Thesis: Hand Orientation Estimation using Deep Neural Networks (advised by Prof. Dr. Wolfram Burgard)
- Erasmus semester at Eötvös Loránd University Budapest, Hungary

Abitur (GPA 3.8)

Stuttgart, Germany

EDUARD-MÖRIKE GYMNASIUM STUTTGART

Sep. 2001 - Jul. 2010

- Intensive courses: Mathematics, Chemistry, German, English, Spanish

Skills

Programming

Python, C++, Java, Bash

Frameworks

NumPy, PyTorch, SciPy, Scikit-learn, PyTorch Lightning, Pandas, Hugging Face, ROS, PyBullet, OpenCV, RDKit

Miscellaneous

Linux, Docker, Mypy, AWS, Slurm, Latex

Languages

German (native), English (highly proficient), Spanish (fluent), Italian (good command)

Publications

- **What Matters in Language Conditioned Robotic Imitation Learning over Unstructured Data**
Oier Mees*, **Lukas Hermann***, Wolfram Burgard
Proceedings of the International Conference on Intelligent Robots and Systems (IROS), 2022, Kyoto, Japan
- **CALVIN: A Benchmark for Language-Conditioned Policy Learning for Long-Horizon Robot Manipulation Tasks**
Oier Mees*, **Lukas Hermann***, Erick Rosete-Beas, Wolfram Burgard
IEEE Robotics and Automation Letters (RA-L), vol. 7, n. 3, pp. 7327-7334, 2022
- **Affordance Learning from Play for Sample-Efficient Policy Learning**
Jessica Borja-Diaz*, Oier Mees*, Gabriel Kalweit, **Lukas Hermann**, Joschka Boedecker, Wolfram Burgard
Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), 2022, Philadelphia, USA
- **FlowControl: Optical Flow Based Visual Servoing**
Maximilian Argus, **Lukas Hermann**, Jon Long, Thomas Brox
Proceedings of the International Conference on Intelligent Robots and Systems (IROS), 2020, Las Vegas, USA
- **Hindsight for Foresight: Unsupervised Structured Dynamics Models from Physical Interaction**
Iman Nematollahi, Oier Mees, **Lukas Hermann**, Wolfram Burgard
Proceedings of the International Conference on Intelligent Robots and Systems (IROS), 2020, Las Vegas, USA
- **Adaptive Curriculum Generation from Demonstrations for Sim-To-Real Visuomotor Control**
Lukas Hermann*, Maximilian Argus*, Andreas Eitel, Artemij Amiranashvili, Wolfram Burgard, Thomas Brox
Proceedings of the International Conference on Robotics and Automation (ICRA), 2020, Paris, France

Awards

2023 **IEEE Robotics and Automation Letters Best Paper Award**, CALVIN

London, UK

Software & Datasets

CALVIN

[GITHUB.COM/MEES/CALVIN](https://github.com/mees/calvin)

- Open-source simulated benchmark for learning long-horizon language-conditioned tasks.
- 24 hours of teleoperated robot environment interaction with 20K language instructions.
- Multi-context imitation learning baselines.

HULC

[GITHUB.COM/LUKASHERMANN/HULC](https://github.com/lukehermann/hulc)

- State-of-the-art model that can learn a wide variety of language-conditioned robot skills from offline free-form imitation datasets.

Student Supervision

2021 **Ilia Dobrusin**, Self-Supervised Consistency Loss for Sim-to-Real Domain Adaptation

Master Thesis

2021 **Mikel Martinez**, Self-supervised Control with Vision and Language

Master Project

2021 **Jessica Borja**, Affordance Learning from Play for Sample-Efficient Policy Learning

Master Project

2021 **Group Project**, Object Grasping on Point Clouds

Deep Learning Lab

Extracurricular Activity

Voluntary social year

Jinotepe, Nicaragua

DEUTSCHE GESELLSCHAFT FÜR INTERNATIONALE ZUSAMMENARBEIT (GIZ)

Aug. 2010 - Aug. 2011

- Organized activities for schoolchildren in a local library.
- Accompanied a local NGO's environmental education program in rural communities.

References

- Prof. Andreas Bender (supervisor internship)** Pangea Bio / Professor at University of Cambridge, andreas@pangeabio.com
Prof. Wolfram Burgard (supervisor MSc/PhD) Professor at University of Technology Nuremberg, wolfram.burgard@utn.de
Dr. Oier Mees (PhD colleague and coauthor) PostDoc at UC Berkeley, oier.mees@eecs.berkeley.edu