

Leon Koch

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Work Experience

2025–present	Working Student – ML Engineer	Charité – Universitätsmedizin Berlin, Pneumology
	- Designed and implemented an end-to-end PyTorch pipeline for clinical respiratory-audio classification (COPD, pulmonary fibrosis, and healthy controls), including preprocessing, spectrogram generation, cross-validation, and Optuna hyperparameter tuning on an HPC cluster. - Benchmarked 10+ deep-learning architectures, including CNN, CNN–LSTM, ViT, wav2vec 2.0, AST, PANNs, VGGish, and BEATs, incorporating demographic features and reproducible workflows using Slurm, Snakemake, and MLflow.	
2024–2025	Research Assistant – Machine Learning	University of Hamburg, Knowledge Technology
	- Optimized unsupervised and semi-supervised autoencoders for industrial anomaly detection using PyTorch. - Developed a full-stack Flutter/Dart application with a Python ML backend for anomaly detection in aviation manufacturing processes.	
2016–2025	Marketing & AI Automation	ItalienZentrum Wirtschaft+Beratung GmbH
	- Co-managed marketing strategy for an Italian–German consulting company. - Researched economics, finance, and labour-law topics and produced bilingual content and interview videos. - Developed a Photoshop-like Windows application in Flutter/Dart for internal marketing workflows, also accessible via a CLI for AI-assisted workflows. - Developed and operationalised an AI-assisted workflow for social-media content, from source-verified research and post creation to graphics and reports.	
2016	Intern	University Medical Center Hamburg-Eppendorf, Cardiology
	Supported ECG measurements, documentation, and clinical work-area preparation.	

Education

2024–present	M.Sc. Computer Science	Freie Universität Berlin
	Focus on artificial intelligence, bioinformatics, and full-stack development.	
2021–2022	Exchange Studies – Computer Science & Psychology	University of Granada
	Focus on data science and social psychology.	
2019–2024	B.Sc. Human–Computer Interaction	University of Hamburg
	Grade: 1.9. Focus on UX and computer vision; bachelor thesis in explainable computer vision using Python and PyTorch.	
2018–2019	Voluntary Social Year	Elbstation, Hamburg
	Provided educational support in theatre and radio courses and performed in the final theatre production.	
2014–2018	German and Italian Secondary-School Diplomas	Deutsche Schule Genua
	Final grade: 1.8.	

Selected Projects

2026	AI-Powered Medical Intake Chatbot • University group project – Co-developed a medical-intake application using React/Next.js, FastAPI, LangGraph, a PostgreSQL database, Docker Compose, and a SAMPLER-based intake flow; refined it based on feedback from Charité emergency-department staff following an interim presentation. • Independent continuation Demo GitHub Benchmark – Integrated Qdrant vector search to retrieve emergency-department information relevant to each patient. – Built a clinician dashboard with ED queue management, human-in-the-loop AI triage, an interactive body map, and structured patient overviews. – Developed a browser-based LLM evaluation harness (HTML + JavaScript) with 33 simulated-user cases, result export, and PDF reporting for medical-intake testing.	
2026	cs-modulio.com Website GitHub • Built and deployed a full-stack AI application with a React/Next.js frontend, Docker Compose, Caddy reverse proxy, and Python backend connected to a production LLM. • Deployed the production stack on DigitalOcean.	
2026	getwizardflow.com Website GitHub PyPI • Built a Python SDK for visualizing multi-agent workflows with direct support for LangGraph agent graphs. • Complemented it with a React/Next.js application for exploring and displaying workflow structures.	
2026	Distributed Particle Simulator GitHub Built a distributed particle simulator in Rust using MPI, with Dockerized execution and Python visualizations.	
2023–2024	Bachelor Thesis – LatentTrace University of Hamburg “LatentTrace: Using the latent space of an encoded anomalous image to retrace the target image.” Trained autoencoders on image data from aircraft fuselage assembly and implemented explainability methods using Python and PyTorch.	

Technical Skills

Machine Learning	Python, PyTorch, Optuna, MLflow, audio classification, computer vision, anomaly detection, XAI
Backend & Data	FastAPI, LangGraph, PostgreSQL, SQL, Qdrant, JSON, REST APIs
Frontend	React, Next.js, TypeScript, JavaScript, Flutter
Infrastructure	Git, Docker, Docker Compose, Slurm, Snakemake, Linux
Additional	Rust, Java, C, Dart, Excel, Adobe Photoshop, Adobe Premiere Pro

Relevant Coursework

Algorithms and Data Structures; Software Development I/II; Theoretical Computer Science; Computer Vision; Audio Signal Processing; Applied Biometry; Telematics; Technical Programming; Artificial Intelligence for Cancer Detection; LLMs in Health; Cluster Computing.

Languages

German	Native
Italian	Native
Spanish	Fluent (C1)
English	Fluent
French	Upper-intermediate (B2)

Interests

Chess, fitness, volleyball, theatre, and languages.