

Lukas Kurz

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I am finishing my MSc in Artificial Intelligence at JKU Linz on the **AI for Simulation** elective track. My thesis predicts turbulent heat flux in tokamak plasma with time-series foundation models and benchmarks them against the GyroSwin-1B neural surrogate. Alongside my studies I have developed and shipped machine learning end to end, including an on-device handwriting recognition model at 96.9% accuracy. I also co-founded a B2B SaaS platform for vineyards, where I owned the entire technical side and led a team of three engineers and a designer. I work mainly in PyTorch and Python and build LLM agent and RAG workflows, on top of seven years of professional software engineering.

EDUCATION

MSc Artificial Intelligence, Johannes Kepler University Linz 10/2025 – expected 2026

AI for Simulation elective track. All coursework completed, including practical work and a seminar on the thesis topic; thesis in progress.

Thesis topic: *benchmarking time-series foundation models for gyrokinetic plasma heat-flux prediction* (supervisor: Fabian Paischer)

- Predicting turbulent heat flux in tokamak plasma, a scalar normally obtained by integrating the 5D distribution function of a nonlinear gyrokinetic simulation.
- Testing how close in-context learning on the scalar flux time series alone can get to the accuracy of the GyroSwin-1B 5D neural surrogate, without modelling the 5D distribution function as GyroSwin does.

Simulation-related coursework: Scientific Machine Learning; Numerical Methods in Fluid Mechanics (Computational Fluid Dynamics, CFD); Computational Physics; Introduction to Particle Simulation; Deep Learning: Geometric Techniques.

BSc Artificial Intelligence, Johannes Kepler University Linz 09/2020 – 09/2025

Thesis: *Vineyard Row Detection from Satellite Imagery using Deep Learning*, grade sehr gut (1), supervisor Jan Schlüter. Completed while co-founding and running Vinitor GmbH full time.

- Annotated the dataset myself, 1,422 rows across 79 Austrian sites in QGIS, from 30 cm basemap.at orthophotos and INVEKOS parcel boundaries.
- Trained a U-Net on four-channel patches (RGB plus parcel mask), reaching 0.99 ± 0.12 m spatial accuracy and 88% row-count accuracy, within the tolerance agricultural GPS needs.
- Compared loss functions for thin linear features (Dice, Tversky, centerline Dice) and defined a row-count metric, since overlap metrics punish one-pixel offsets that do not matter in the field.

HTL Leonding, secondary technical college, computer science 09/2014 – 06/2019

Diploma thesis on building a modern cryptocurrency exchange. Coursera certificates in Machine Learning and the Deep Learning Specialization.

RESEARCH & MACHINE LEARNING PROJECTS

Apollonia, handwriting recognition for dental examination records 2025 – 2026

Contract project for AKS-ZAVOMED, an Austrian NGO; ~50,000 scanned handwritten forms in scope.

- Trained a custom CNN (~120–150k parameters, 12 classes, 32×32 grayscale regions of interest) that reads per-tooth codes, reaching **96.93% per-cell accuracy** (3,257 of 3,360 cells).
- Reached that result through an automated experiment loop over 19+ model variants, closing the gap between public handwriting datasets (EMNIST, ARDIS, DIDA) and Austrian digit conventions with ~1,200 hand-labelled dental cells.
- Deployed fully on-device to satisfy GDPR, with ONNX INT8 export for CPU inference on Apple M1 Max and a PySide6 review interface for the operator.

Brainchair, open-source MCP server in Go, github.com/lukaskurz/brainchair 2026

- Built an always-on Model Context Protocol (MCP) server giving Claude Code, Claude Desktop and other clients one shared SQLite memory, with FTS5 full-text search, filters on kind, domain, project and tags, and version history kept by database triggers.
- Entry types are registered at runtime and generate their own SQL views, indexes and typed MCP tools with JSON schemas. In daily use as my knowledge store and CRM, currently 265 entries across 8 types.

PROFESSIONAL EXPERIENCE

Vinitor, B2B SaaS for vineyard and agricultural management, Linz 09/2021 – present

GPS time tracking, plant-protection documentation, plot and equipment management, sold to vineyards and agricultural operations in the DACH region.

Founder & sole engineer, Vinitor Software Solutions e.U. since 09/2025

Continued the product alone after taking over the intellectual property from the GmbH, now as a side project alongside my studies.

- Build and run the entire stack alone, covering the Kotlin/Spring Boot backend, PostgreSQL/PostGIS, Angular dashboard, Flutter mobile app in 16 languages, GitLab CI, Hetzner and Cloudflare infrastructure, Stripe billing.
- Integrate national geodata services (AMA/INVEKOS OGC API, basemap.at, SWISSIMAGE, BKG DOP20, Czech LPIS); currently 5–8 paying operations plus free accounts.
- Do everything customer-facing myself, from sales and onboarding to support, release updates, the email newsletter and marketing, in German and English.
- Run development on agentic workflows (Claude Code with parallel worktrees, LLM-scaffolded documentation and landing pages, LLM-assisted translation across 16 languages), which is what keeps a product this size maintainable by one person.

Co-founder, then CTO / Geschäftsführer (technical), Vinitor GmbH 09/2021 – 2025

- Owned the complete technical side of an 8-person company; hired and led 3 software engineers and 1 UI/UX designer.
- Built the Flutter mobile app, the CI/CD pipelines and the server infrastructure, and worked across the Angular dashboard and Spring backend; 25–35 customers at peak.
- Joined during Covid as the engineer needed to turn a colleague's diploma project into a product, and moved into the technical lead role as the team grew.
- Company entered insolvency in early 2025 (concluded 2025); let the technical team go, took over the intellectual property and continued the product alone at my own cost.

Software Engineer, Dynatrace, Linz, Node.js Agent team 08/2019 – 2020

- Researched and built a microbenchmarking framework for Node.js code, later released as open source; work on code optimization, JIT compilation and V8 internals.

Austrian Armed Forces, driver, mandatory service 2020

Earlier experience 2016 – 2019

Software engineering internships at Catalysts (2018, mobile-first prototype of Porsche Informatik sales software), Dynatrace (2017) and GoWest Communications (2016). Freelance work during secondary school, including exam software for WIFI and the roofers' and plumbers' trade association.

SKILLS

Machine learning & research: PyTorch; time-series foundation models; in-context learning; surrogate modelling; CNNs; computer vision and OCR; ONNX and INT8 quantized inference; automated experiment loops run in parallel across rented remote GPU machines (Lambda, RunPod). JAX from coursework only.

LLMs & agents: Claude API; MCP (built my own server); tool-use and agent workflows; Retrieval-Augmented Generation (RAG); agentic coding.

Scientific computing: numerical methods; Computational Fluid Dynamics (CFD) basics; particle simulation; computational physics, all from coursework.

Engineering & infrastructure: Python, Kotlin, Java, Go, TypeScript, Dart, Swift, C/C++, SQL; Spring Boot, PostgreSQL/PostGIS, Docker; Linux server administration and shell scripting; GitLab CI with self-hosted runners, Hetzner, Cloudflare; Flutter, Angular.

Languages: German (native), English (fluent).

OPEN SOURCE & AWARDS

Merged pull request in the official Flutter repository, plus pull requests to Flutter libraries. Regular Hacktoberfest participant; GitHub Arctic Code Vault contributor. 2nd place, Catalysts Coding Contest Juniors, 2018.