



Recent projects

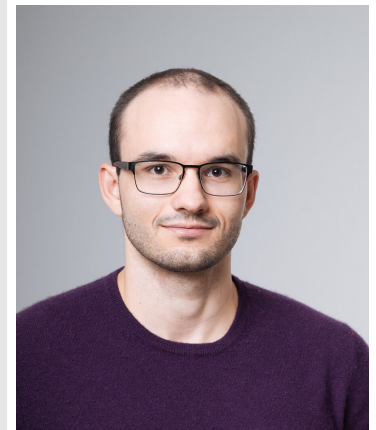
- MSc thesis **Galactic Gamma-Ray Emission with PICARD**
Turning a research code for gamma-ray maps of the Milky Way into modern, reusable C++: refactored and extended PICARD's gamma-ray pipeline with HEALPix line-of-sight integration, parallel I/O across nodes, and cross-checks against HERMES via pybind11.
- Ongoing **Zilatran Chess using Reinforcement Learning**
Teaching an AI a chess variant through self-play on a compute cluster: reinforcement learning environment in Python with MPI-distributed play and PyTorch networks.
- 2026 **Tall-Skinny QR Decomposition**
GPU linear algebra written from scratch: several QR algorithms in CUDA/C++ without vendor libraries, with GoogleTest unit tests and automated benchmarking and profiling.
- 2026 **Molecular Simulation Framework**
Molecular mechanics simulations, from the physical model to GPU kernels: modular Python/C framework with Lennard-Jones and Ewald/PME Coulomb interactions, Monte Carlo sampling, and Numba/CUDA acceleration.
- 2025 **Natural Evolution Strategies**
Optimizing without gradients: evolution strategies over parametrized search distributions for general black-box problems (Python).

Education

- 2025–present **MSc Physics**
University of Innsbruck, Austria · expected February 2027
Thesis: “Improved Simulated Gamma Emission Maps – From Ring Model to HEALPix-Based Gas Models”
Supervisor: Ralf Kissmann
- 2025–2026 **Extension Study Programme in Scientific Computing**
University of Innsbruck, Austria
High-performance computing (HPC), numerical methods (FEM, PDE solvers), machine learning, and software engineering for scientific applications
- 2021–2025 **BSc Physics**
University of Innsbruck, Dept. of Ion Physics and Applied Physics
Thesis: “Genetic Algorithms for Surface Optimization of Metal Oxides as Catalysts for CO₂ Hydrogenation”, computed on the LEO5 HPC cluster
Supervisors: Milan Ončák, Gabriel Schöpfer
- 2020 **Abitur**
Humboldt-Gymnasium Karlsruhe, Germany

Additional exposure

- Personal Remote administration of Linux systems
- Personal Declarative, reproducible system configurations with NixOS
- 2026 Real-time GLSL shaders
- 2024 CI/CD work on deploying Python packages



About me

Physicist turned scientific programmer. I write performance-oriented C++ and Python code for massively parallel systems, from multi-node CPU clusters to GPUs. Graduating in February 2027 and looking for roles in scientific, HPC or simulation software.

I spend my free time as a certified ski touring trainer for the German Alpine Club (DAV).

Skills

Numerics

Optimization (genetic algorithms, evolution strategies), PDE solvers, MCMC, FEM, multigrid

C/C++

CUDA, MPI, OpenMP, GoogleTest, pybind11, HEALPix

Python

PyTorch, Numba, mpi4py, NGSolve

Linux HPC clusters

LEO5, VSC-4, VSC-5; SLURM

Tools

GitLab CI/CD, Docker

Languages

German

Native speaker

English

Fluent (C1)