Davide Mattioli

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Work Experience

Data Analyst - Internship *Göttingen*
GWDG *06/2025 – Present*

- Developed energy efficiency metrics tracking SLURM jobs, enabling energy related KPI.
- Integrated energy pricing APIs into HPC SLURM job analysis, enabling real-time cost tracking.

Research Assistant *Göttingen*
Göttingen University (Remote Sensing Lab) *03/2025 – Present*

- Managed the open-source ETL codebase for UAV image processing, ensuring reliability during research.
- Streamlined UAV image data extraction by redesigning ETL workflows, increasing processing speed by 30x.
- Led the research paper development as main author, coordinating data analysis and literature review.

Education

MS.c., Applied Data Science *Göttingen*
Göttingen University *04/2026 (Expected)*

- GPA: 1.9 (Bavarian System)
- Collaborated with a four-member team to win the LLM Hackathon at Vienna Law as Code 2025.
- Planning to lead a team of six in the 2025/2026 scalable storage competition.
- **Coursework:** ML, DL for Computer Vision, Graph ML, Scalable Computing Systems, Sensor Data Fusion,

BS.c., Economics and Data Science *Turin*
Università di Torino *10/2023*

- GPA: 104/110
- Collaborated in the Machine Learning Club to develop an RNN-based noise reduction model for EEG data.
- Developed a ML pricing model for Index fund Pricing with LSTM.

Volunteering

Volunteer Researcher *Turin*
Machine Learning Journal Club *10/2021 – 12/2023*

- Prepared and preprocessed EEG datasets for club research, including artifact detection and removal.
- Developed and applied noise reduction models to EEG data, improving signal quality for ML analysis.
- Designed and delivered Python programming workshops for biology students, focusing scientific computing.

Publications

Mapping Canopy Anisotropy from Multiangular UAV Observations *12/2025 (Planned)*

Davide Mattioli, Rene Heim, Nathan Okole

This paper investigates the anisotropic reflectance behavior of vegetation canopies using multiangular data captured by UAV-mounted cameras. By analyzing the variation in reflectance across different viewing angles, we model canopy structure and assess vegetation properties.

Technologies

Programming: Python, Julia, C++, Rust, Bash

ML Frameworks: PyTorch, TensorFlow, Keras, scikit-learn, SciPy , W&B

DevOps/HPC: Docker, Kubernetes, SLURM, Git, S3, Snowflake, Linux (Debian/Ubuntu/Arch)

Data/Geo: Pandas, Polars, rasterio, GDAL, OpenCV, matplotlib, Numpy

Languages: English (C1), German (A2), Italian (Native)

Projects

UAV Multispectral Imaging Pipeline *Link*

- Developed robust, reproducible pipeline to extract and analyze oblique/nadir reflectance angles from UAV-based multispectral cameras for crop phenotyping research (Precision Agriculture, 2024).
- Designed modular Python scripts for automated processing: alignment of orthophotos/DEMs, geospatial filtering, vegetation index computation, sun/view angle extraction, and batch postprocessing.
- Leveraged libraries such as Polars, Rasterio, Geopandas, and PyProj for scalable, memory-efficient geodata processing; applied parallelization (ThreadPoolExecutor, asyncio) for high-performance I/O and file search.
- Implemented YAML-based configuration, error handling, logging, and reproducible workflow setup; integrated with Agisoft Metashape and Exiftool for advanced image and metadata management.

Human Pose Classification via Graph Neural Networks *Link*

- Implemented and benchmarked multiple GNN architectures (GCN, GAT, GINE, TransformerConv) using PyTorch Geometric for action classification on the Human in Kitchen pose dataset.
- Engineered data loaders to represent each human pose frame as a graph, encoding spatial relationships.
- Benchmarked GCN, GAT, GINE, and TransformerConv models using PyTorch Geometric on pose-action graphs; achieved 89% multi-class accuracy.
- Integrated edge and node feature engineering, global pooling, and custom batch normalization.

GPU-Accelerated Phytoplankton Convection Simulation (Julia) *Link*

- Implemented large-scale, GPU-parallelized fluid dynamics simulations in Julia using Oceananigans.jl, modeling oceanic phytoplankton convection via Boussinesq equations.
- Designed and tuned simulation grids (C-grid, periodic/bounded BCs), implemented WENO advection schemes, and managed time-stepping using Adams-Bashforth/Runge-Kutta algorithms.
- Benchmarked GPU performance, demonstrating 25x speedup leveraging CUDA acceleration.
- Integrated stochastic initial conditions, dynamic buoyancy flux decay, and biologically-motivated plankton growth/mortality modules for realistic bloom dynamics.