Ville Lähteenlahti

Helsinki, Finland +358 443233093 **lahteenlahti.net** ville@lahteenlahti.net github.com/vilahte

About Me

I am a machine learning scientist and engineer with solid knowledge in physics and software engineering.

I have been a part of various software and machine learning projects. My main strength is my research experience, which translates into solid problem-solving skills, precise reporting, and the ability to quickly familiarize myself with complicated systems. I hold a PhD in physics focused on neuromorphic devices, which also included the equivalent of an MSc in computer science and machine learning.

Professional Experience

Jul 2021 – Present

Linear Oy – Machine Learning Scientist (Responsible for ML in company)

- Data modeling with neural networks, generative AI for content generation and processing, prediction services, RAG.
- Systems design, implementation and deployment (Azure, PyTorch, XGBoost, Python, PostgreSQL).
- Projects: LLM-based writing service in 2021, geospatial regression models, interactive chatbots, data imputation with generative AI, full-system translations with LLM, led a data migration project between three real-estate systems.

Feb 2018 – Oct 2022

University of Turku, Wihuri Physical Laboratory – Doctoral Researcher

- Wrote programs to control and analyze scientific measurements (scikit-learn, PyTorch, numba, pandas)
- Followed state-of-the-art of neuromorphic devices, worked with neural networks and device simulations.
- Teaching assistant: *Thermodynamics*, *Mechanics*, *Electromagnetism* and *Atomic & molecular physics*.
- Research resulted in Business Finland project with 600k€ funding.
- Published peer-reviewed articles as the first author and attended international conferences.
- Created functioning memristor devices using lithography methods and physical vapor deposition.

Jan 2021 – Jul 2021

Nordic ID Oy – Cloud Software Engineer

- Deployed services, configured networks and set up managed databases on Amazon AWS.
- Designed and implemented access control system for an autonomous store (PostgreSQL, Redis, FastAPI, OpenAPI).
- B2B integration and data processing related to payment and inventory handling.

Sep 2017 – Feb 2018

University of Turku, Wihuri Physical Laboratory – Project Researcher

- Worked as a researcher and IT system administrator of the laboratory.
- Interfaced, operated and programmed scientific instruments. Did multidimensional measurement data analysis.
- Designed electrical measurement system for low temperature and memristor research.

Jun 2016 – Sep 2017

University of Turku, Department of Physics and Astronomy – Research Assistant

- Programmed scientific instruments and designed measurements.
- Fabricated nanoscale $Pr_{1-x}Ca_xMnO_3$ perovskite thin films for colossal magnetophotoresistance studies.
- Studied low temperature physics, including superconductivity and the handling of cryogenic substances.

Oct 2012 – Jan 2013

Suomen Prosessiautomaatioasennus Oy – Software Engineer Internship

- Improved online store by automating the scraping of product information of store items from electrical part number database using Python.

Oct 2011 – Jan 2012

UTU Oy – Electrical Assembler

- Assembled electrical distribution boards. The work included part collection from the warehouse, wiring of the distribution boards and ensuring that the assembled boards pass the quality control.

Education

2018 – 2022

PhD in Physics, neuromorphic devices (funded position)

University of Turku, Wihuri Physical Laboratory.

- Thesis subject: *Memristor devices based on low-bandwidth manganites.*
- Collaboration-, presentation- and analytical skills
- Machine learning theory, simulations, instrumentation, experiment design and software development.

2018 – 2020

Courses in Software Development, Data Analytics and Machine learning

University of Turku, Department of Future Technologies.

- Completed M.Sc. curriculum of computer science, with emphasis on machine learning.
- Attended summer schools and workshops in high performance computing (HPC).
- The studies included deep learning, distributed systems, algorithm design, SWE best practices and game development.

2013 – 2017 | **Master of Science in Physics**
University of Turku, Department of Physics and Astronomy.
- **Graduated with the highest grade**
- Minors in computer science and mathematics. Included advanced calculus and algorithmic mathematics.
- MSc Thesis: *Manufacturing and characterisation of $Pr_{0.6}Ca_{0.4}MnO_3$-based resistive memory.*
- BSc Thesis: *Manufacturing, materials and theory of oxide-based memristors.*

2010 – 2013 | **Finnish Matriculation Examination and Vocational Qualification, Electrical and Automation Engineering**
Ulvilan Lukio, Sataedu Ulvila.
- Learned electrician's trade and attended the Finnish matriculation examination.
- Physics: *Laudatur*, Advanced math: *Eximia cum laude approbatur.*
- Diploma work on PLC programming and interfacing of sensors. Included CAD, circuit design, PLC programming and industrial electrical installations.

CERTIFICATIONS AND SCHOOLS

CSC Deep Learning and GPU Programming Workshop 2020
- NVIDIA Deep Learning Institute: ACCELERATED COMPUTING WITH CUDA C/C++
- NVIDIA Deep Learning Institute: DEEP LEARNING FOR MULTI-GPUS

CSC Summer School in High Performance Computing 2019
- HPC programming with message-passing, threading and parallel I/O using C, Fortran, OpenMP, Open MPI and openACC.

LANGUAGES & SKILLS

Machine Learning • Software Engineering • Data Science
Agile Methodologies • DevOps Principles • Containerization • **Azure** • AWS
Python and its frameworks, C, SQL, Linux, *Any other depending on need*

SCIENTIFIC

Physics • Simulations • Modeling • Experiment design • Device instrumentation
Resistive Switching • Perovskite Oxides • Neuromorphic devices
PLD • XRD • EBPVD • SEM • AFM • XPS • SQUID • PPMS

RESEARCH

Peer Reviewed Journal Publications
- *Bio-plausible synaptic behaviour in Gd0.3Ca0.7MnO3-based memristor devices for Unsupervised Spiking Neural Networks*, , ACS Applied Electronic Materials, 2023
- *Compact modeling and SPICE simulation of GCMO-based resistive switching devices*, E. Miranda, **V. Lähteenlahti**, H. Huhtinen, A. Schulman, P. Paturi, IEEE Transactions on Nanotechnology, 2022
- *Electron doping effect in resistive switching properties of Al/$Gd_{1-x}Ca_xMnO_3$/Au memristor devices*, **V. Lähteenlahti**, A. Schulman, A. Beiranvand, H. Huhtinen, P. Paturi, ACS Applied Materials & Interfaces, 2021
- *Transport properties of resistive switching in Ag/$Pr_{0.6}Ca_{0.4}MnO_3$/Al thin film structures*, **V. Lähteenlahti**, A. Schulman, H. Huhtinen, P. Paturi, Journal of Alloys and Compounds, 2019
- *Metastable ferromagnetic flux closure-type domains in strain relaxed $Gd_{0.1}Ca_{0.9}MnO_3$ thin films*, A. Schulman, H. Palonen, **V. Lähteenlahti**, A. Beiranvand, H. Huhtinen, P. Paturi, Journal of Physics: Condensed Matter, 2020
- *Appearance of glassy ferromagnetic behavior in $Gd_{1-x}Ca_xMnO_3(0<x<1)$ thin films*, A. Schulman, A. Beiranvand, **V. Lähteenlahti**, H. Huhtinen, P. Paturi, Journal of Magnetism and Magnetic Materials, 2020
- *Tuned AFM-FM coupling by the formation of vacancy complex in $Gd_{0.6}Ca_{0.4}MnO_3$ thin film lattice*, A. Beiranvand, M. Liedke, C. Haalisto, **V. Lähteenlahti**, A. Schulman, S. Granroth, H. Palonen, M. Butterling, A. Wagner, H. Huhtinen, P. Paturi, Journal of Physics, Condensed Matter, 2021

News
- *ML/Physics*, **Patentoitu memristori eli muistivastus on niin pieni, että se mahtuu jopa kännykän mikrosirulle**, Yle, 2024
- *ML/Physics*, **Memristor voitti insinöörien keksintökisan**, Uusi Teknologia, 2024
- *ML/Physics*, **Suomalaistutkimuksessa tietokoneet jäljittelevät ihmisaivoja – muistin tila säilyisi sähkökatkonkin yli**, Tekniikka & Talous, -
- *ML*, **Suomalaisyritys loi tekoälyn, joka laatii asuntoesittelyjä kiinteistönvälittäjien puolesta**, Talouselämä, -
- *ML/Physics*, **Turun yliopistolle Business Finlandilta 635 000 euron rahoitus tekoälytutkimukseen**, Turun Sanomat, -
- *Physics*, **Fysiikan päivillä näytettiin, kuinka typpi kiehuu**, Aamuset, -

Conferences
- *International Conference on Memristive Materials, Devices & Systems (MEMRISYS)*, Poster presentation, Dresden, 2019
- *12th Spanish Conference on Electron Devices*, Poster presentation, Salamanca, 2018
- *Physics Days 2018*, Poster presentation, Turku, 2018

Misc.

- *Positron annihilation spectroscopy beamline experimenter*, ELBE; Helmholtz-Zentrum Dresden Rossendorf, Dresden, 2020
- *Presentation*, **Link to an example presentation on spiking neural networks**; UTU, Machine learning and algorithmics seminar, 2019
- *Video*, **3D reconstruction from old photos using neural radiance fields**, ML, 2022