

Nguyen Xuan Binh

binh.nguyen@aalto.fi ❖ (358) 457- 833-5403 ❖ Espoo, Finland ❖ [GitHub](#) ❖ [Linkedin](#)

WORK AND RESEARCH EXPERIENCE

Aalto University

Apr 2023 – Present

Research Assistant

Espoo, Finland

- Conducted research integrating machine learning and optimization algorithms into computational models for simulations, building upon expertise from computer science, data science and materials engineering disciplines.
- Developed and implemented AI-driven predictive models for hydrogen embrittlement and fracture mechanics, using advanced computational techniques from phase field methods to anisotropic plasticity behavior.
- Collaborated with interdisciplinary teams on EU-funded projects, applying AI and FEM techniques to sustainable energy solutions in materials research.
- Presented AI-driven computational simulation at international conferences and project meetings, contributing to knowledge exchange between data science and materials science communities.

F-Secure

Sep 2023 – June 2024

Machine Learning Engineer Internship

Helsinki, Finland (Remote)

- Led the development of AI-based cybersecurity solutions, utilizing machine learning algorithms for real-time fraud detection in online web shops.
- Applied skills machine learning to design robust models that improved fake webshop detection accuracy by 10%.

Aalto University

Jan 2023 – Apr 2023

Teaching assistant

Espoo, Finland

- Assisted in the Artificial Intelligence course within the Computer Science department, focusing on practical applications of machine learning algorithms such as logic system, neural networks, and language models.
- Provided mentorship to students working on AI-based projects and supported lab sessions.

PUBLICATIONS

Juan, R., Nguyen Xuan, B., Liu, W., Lian, J. (2023). Optimizing crystal plasticity model parameters via machine learning-based optimization algorithms. Material Forming: The 26th International ESAFORM Conference on Material Forming - ESAFORM 2023, Kraków, Poland, April 19-21, 2023. DOI: [10.21741/9781644902479-153](https://doi.org/10.21741/9781644902479-153)

Juan, R., Nguyen Xuan, B., Lian, J. A novel multi-objective parameter optimization method combining machine learning and nondominated sorting genetic algorithms for multi-strain-path crystal plasticity modeling. Engineering with Computers (In peer review).

CONFERENCES & PROJECT MEETINGS

Materials Science and Engineering (MSE) Conference, Darmstadt, Germany, Sep 2024

Key Activity: Delivered an oral presentation on using phase field damage methods in predicting fracture behavior of hydrogen charged specimens under different stress states and loading directions.

EU-HyWay Project Meeting on Hydrogen Economy, Aalto University, Sep 2024

Key Activity: Participated in a project meeting focused on advancements in multiscale characterization & simulation for hydrogen embrittlement assessment.

Aalto University Summer Workshop on Multiscale Modeling, June 2023

Key Activity: Attended a seminar to discuss the latest trends in multiscale modeling and high-performance simulations, from ABAQUS, DAMASK to lattice simulations with participants from RWTH Aachen University.

EDUCATION

Aalto University

Master in Machine Learning, Artificial Intelligence and Data Science (Expectant)

Sep, 2024
Espoo, Finland

- **GPA: 4.62/5.0.** Passed with Honor

Aalto University

Bachelor in Computational Engineering

July, 2023
Espoo, Finland

- **GPA: 4.84/5.0.** Passed with Honor
- Department of Mechanical Engineering's Dean List

SKILLS & PROJECTS

▪ Skills in Mechanical Engineering and Materials Science

- 1) Proficient in finite element simulations using Abaqus for modeling material behavior under mechanical stress.
- 2) Experienced in phase field damage formulation for modeling fracture mechanics and hydrogen diffusion.
- 3) Developed user subroutines in Abaqus (UMAT, VUMAT, UMATHT, UEL) for multiphysics simulations.
- 4) Skilled in micromechanical modeling (DAMASK, RVE, crystal plasticity, and homogenization) to analyze material properties such as flow curve, dislocation densities and r-values.

▪ Skills in Artificial Intelligence and Machine Learning

- 1) Extensive experience with AI frameworks like TensorFlow and PyTorch for data-driven simulations
- 2) Utilized genetic algorithms and Bayesian optimization for parameter calibration in material models, particularly in crystal plasticity and fracture mechanics.
- 3) Developed deep learning models such as ANN and GAN for material property predictions in various simulation environments.
- 4) Integrated machine learning into ABAQUS subroutines to potentially replace FEM simulations.

▪ Skills in Programming and Software Engineering:

- 1) Proficient in Python, C++, R, Matlab, Bash, and Fortran for computational simulations and data processing.
- 2) Applied version control and best practices in software engineering to ensure scalability, reproducibility, and collaborative coding environments.
- 3) Implemented scalable, modular code for parallel computing on the CSC Finnish supercomputer, optimizing large-scale simulations.
- 4) Created universal optimization pipelines with and without using machine learning algorithms.

- **Interests:** FEA simulations, large language models, automation of workflow pipelines

LANGUAGE SKILLS

- **English:** Proficient – IELTS 8.0/9.0, SAT 1480/1600
- **German:** Basic – A2 level
- **Japanese:** Intermediate – JLPT N3 level
- **Vietnamese:** Native

SIGNATURE

DATE: 13/06/2025

 Nguyen Xuan Binh