Halidu Abdulai

Education

Erasmus Mundus Joint Master's Degree Programme
Engineering of Data-intensive Intelligent Software Systems (EDISS **Aug 2023 – Jul 2025**

1. *MSc, Intelligent Systems (Computer Vision & Data Science)*; *University of the Balearic Islands* *Palma, Spain*

2. *MSc, Computer Engineering; Åbo Akademi University* *Turku, Finland*

Thesis: Employing Large Language Models for Systematic Extraction of Nanoparticle Designs from Scientific Literature [pdf], Grade: 10/10

***Relevant Coursework**: Artificial Intelligence, Machine Learning, Data Science, Embedded AI, GPU programming, Computer Vision & 3D Reconstruction, Image & Video Analysis, Image Indexing & Retrieval by Content, Medical Image Processing, Advanced Techniques in Data Mining (NLP-focused)*

Karadeniz Technical University **Trabzon, Turkey**
BSc, Computer Engineering; high honors; Rank: 1/120 *Sep 2019 - Jul 2023*
- Erasmus+ Exchange Student: AGH University of Science and Technology, Krakow, Poland Feb 2022 - Jul 2022

Research Experience

NAP4DIVE **Europe Horizon Project**
Research Assistant *Jan 2025 – Present*
- Developed an evidence-based, zero-shot extraction framework using open-weight LLMs to reliably automate the extraction of nanoparticle design data from scientific literature.
- Created and open-sourced a dataset of 526 nanoparticle designs to serve as a benchmark for future research in the field.
- Develops machine learning models to predict the likelihood of nanoparticles crossing the blood-brain barrier (current focus).

Mirka Oy **Jeppo, Finland**
Physics-Informed Machine Learning – Machine Scientist; Research Intern *Nov 2023 – April 2024*
- Created a neuro-symbolic framework to identify fundamental physical laws from industrial time-series data.Developed a Python computational pipeline to combine deep learning models (the "neuro" component) with symbolic physical constraints, enhancing model generalizability and interpretability.

Turku University Hospital **Turku, Finland**
Machine Learning Researcher (Part-time) – Apnea Prediction in Premature Infants *Oct 2023 – Jun 2024*
- Developed deep learning models in PyTorch to analyze and interpret physiological time-series data (EDI, SpO2) from premature infants.
- Developed a custom data processing and feature extraction pipeline to manage noisy, real-world clinical data, resulting in the identification of key device artifacts.
- Focused on model interpretability to effectively communicate findings to clinical stakeholders, ensuring the relevance and trustworthiness of the algorithm's predictions.

Karadeniz Technical University **Trabzon, Turkey**
Machine Learning Research Intern *Jul 2022– Sep 2022*
- Developed and optimized custom PyTorch deep learning pipelines for classifying hand and foot movements using high-dimensional EEG data.
- Conducted thorough feature engineering and exploratory data analysis on complex brain-computer interface datasets to identify the most informative features, which enhanced model performance and robustness.

Industry Experience

Huawei Health Lab R&D **Helsinki, Finland**
Data Analytics; Intern *Jun 2024– Sep 2024*

- Designed ML-enabled dashboard (using Plotly Dash) to streamline data workflows (+30% efficiency)
- Led participant recruitment and ensured ethical collection of physiological data for wearable technology studies.
- Collaborated with multidisciplinary teams to develop strength-training algorithms, using ML methodologies to improve wearable technology development.

Bordo Bilişim Ticaret Ltd. Şti. **Samsun, Turkey**
Software Engineer; Intern *Jul 2021 – Dec 2021*

- Developed an e-commerce web application using Django, boosting the client's customer count by 10%.
- Developed "CovidTrack," a health tracking prototype for COVID-19 prevention among employees.
- Trained new interns, which directly increased workflow productivity by 7%.

Teaching Experience

Teaching Assistant – Edge AI, Åbo Akademi University, 2024–2025 (Prof. Sebastien Lafond)

- Provided assistance in lectures, labs, and student support for a graduate-level Edge AI course.

Publications & Manuscripts

- **Abdulai H.***, Manresa-Yee C., Rexha H., Lafond S.; Evidence-based Zero-shot Extraction of Blood-Brain Barrier Related Nanoparticle Design Parameters Using Open-weight Language Models; *Under review*

Presentations & Talks

- Smaller Models, Bigger Impact: Evidence-based Zero-Shot Extraction of Nanoparticle Design Parameters from Scientific Literature; **Oral Presentation**; Computational Methods in Drug Discovery Symposium; University of Helsinki; Nov. 13, 2025
- Assessing the Applicability of Large Language Models for Nanomaterials Data Mining: A Case Study on Extracting BBB-Related Nanoparticle Design Parameters; **Oral Presentation**; Doctoral Students Symposium, Åbo Akademi University; Oct. 3, 2025
- Enhancing AI with Real-World Laws: The Role and Impact of Physics-Informed Machine Learning; **Oral Presentation**; 5th Global Summit on Artificial Intelligence Webinar, (Heighten Science Publications Inc). Apr. 22, 2024

Leadership

Erasmus Mundus Association (EMA) – Country Representative (Ghana) *Jul 2025 – Present*

- Leads and coordinates Erasmus Mundus activities in Ghana. Acts as the main liaison between Ghanaian students and EMA.

Erasmus Mundus Association (EMA) – Programme Representative (EDISS) *May 2024 – Present*

- Represents the EDISS programme within the EMA network. Coordinates activities and reports on EDISS programme initiatives.

African Students in Trabzon Association (ASTRA) – Vice President *Nov 2021 – Nov 2022*

- Organized cultural, academic, and support activities for the African student community in Trabzon, Turkey. Led organizational meetings and represented student interests to local institutions.

Skills

- **Programming Languages:** Python, C, C++, Java, JavaScript, MATLAB
- **Machine/Deep Learning:** PyTorch, Tensorflow, Keras, OpenCV, Scikit-Learn, MLFlow, OpenMP/MPI
- **Spoken Languages:** English (Native/Bilingual), Turkish (C1), Spanish (B1)

Selected Awards, Grants, & Honors

- Åbo Akademi University, Most Promising International Master's Student Award (€5,057). Recognized for outstanding research potential. June 2025
- Grand Prize, Nokia Challenge Finland: First place in the Nokia hackathon for AI-based network optimization. *Nov 2023*
- Erasmus Mundus Scholarship for Double Degree Master's Programme (EDISS – 5.6% acceptance rate) *Aug 2023*
- Best Graduating Student (1/120), Computer Engineering Department, Karadeniz Technical University *Jul 2023*

- Fully Funded Turkish Government Scholarship Awardee *Sep 2018*

Referees

References available upon request.