VU ANH LE

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RESEARCH INTERESTS

Computational Sustainability, Environmental Fluid Mechanics, Alternative Energy Systems, Carbon Sequestration, Computational Modeling and Simulation, Evidence-based Law and Policy

EDUCATION

Beloit College Beloit, WI
Bachelor of Science, Mathematics
Relevant Coursework: Introduction to Proofs, Calculus I/II, Discrete Mathematics, Linear Algebra, Mathematical Statistics, Differential Equations, Complex Analysis, Mathematics Colloquium, Object-oriented Programming, Data Structures and Algorithms, University Physics I/II, General Chemistry, International Political Economy

AWARDS AND HONORS

Presidential Scholarship, Beloit College, Awards 48,000 USD annually *Aug 2021 - May 2025*
Board of Trustees Grant, Beloit College, Awards 10,000 USD annually *Aug 2021 - May 2025*
Dean's list, Beloit College *Every semester*
MIT Summer Research Program, Massachusetts Institute of Technology *June 2024*
Semi Finalist, InSPiR2eS Global Pitching Research Competition 2023 (IGPRC 2023) *Jan 2024*
Station1 Frontiers Fellowship, Massachusetts Institute of Technology, Awards 13,500 USD *June 2023*
National Research Grant, Vietnam's Ministry of Finance, Awards 10,000 USD *Jan 2023*
Friends of UTokyo Scholarship, The University of Tokyo, Awards 4,000 USD *Jun 2022*

PUBLICATIONS

1. Vu, Thi Phuong Thao, Dang, Truong Giang, and Le, Vu Anh. "Reliability Assessment of Land Subsidence Monitoring Results Using PSI Technique in Ho Chi Minh City, Vietnam." *International Journal of Environmental Studies 81,* no. 2 (March 3, 2024): 881–95. **[Manuscript URL]**

2. Vu, Thi Phuong Thao, Le, Vu Anh, and Kalibbala, Martin. "Estimating the impact of climate change on flood-flow patterns into the Ban Chat Reservoir, Northern Vietnam." *Under peer-review.* **[Manuscript URL]**

RESEARCH EXPERIENCE

Massachusetts Institute of Technology Cambridge, MA
Research Assistant, Department of Nuclear Science and Engineering *Aug 2023 – Present*
Incoming Intern, Summer Research Program - General *June 2024 - Aug 2024*

- **Research Advisor:** Prof. Haruko Murakami Wainwright.
- **Project:** Modeled groundwater flow and contaminant transport dynamics to support long-term monitoring strategies in the local watersheds near the Savannah River Site, a Department of Energy-owned nuclear materials Superfund facility. Analyzed the impact of factors such as aquifer and well depth on contaminant mobility.
- **Methods:** Employed the PyLEnM package for regression analysis, reading partial differential equations (PDEs) like the advection-dispersion equation to understand groundwater flow patterns. Implemented random forest regression to identify key factors affecting contaminant concentration variations. Currently designing a combined convolutional neural network (CNN) and long short-term memory (LSTM) model with attention mechanisms for time-series forecasting of contaminant levels, aiming to improve prediction accuracy and reduce the frequency of field sampling.

Vietnam's Ministry of Natural Resources and Environment Hanoi, Vietnam
Research Assistant and Compliance Reporter, Remote Sensing Department *April 2020 - Present*

- **Research Advisor:** Dr. Le Quoc Hung.
- **Project:** Monitoring human-induced land deformation processes and accessing the impact of hydroelectric power plants in Vietnam territories.
- **Methods:** Established image networks using Synthetic Aperture Radar (SAR) data to monitor ground movements. Performed interferometric processing to analyze phase shifts, revealing land deformation patterns. Formulated models for primary and secondary displacement. Employed kriging, a geostatistical technique, to validate displacement maps. Utilized finite element methods (FEM) to simulate deformation processes caused by groundwater extraction, hydraulic fracturing, and mining activities.

Massachusetts Institute of Technology Remote
Summer Fellow, Station1 Frontiers Fellowship *June 2023 - Aug 2023*

- **Research Advisor:** Prof. Christine Ortiz.
- **Project:** Applying LCA methodology to quantify the environmental benefits of biodegradable materials compared to traditional polymers, with a specific focus on polylactic acid (PLA) as an alternative to PVC.
- **Methods:** Employed the ReciPe model for LCA, which utilizes impact assessment methods and normalization factors to translate various environmental impacts into a set of sub-scores.

University of Tokyo Kashiwa, Chiba, Japan
Summer Intern, Graduate School of Frontier Sciences *April 2022 - Aug 2022*

- **Research Advisor:** Prof. Frith Martin.
- **Project:** Developing a sorting algorithm to identify orthologous regions in genomic datasets, aiming to uncover different disease mechanisms e.g. asthma. Orthologous regions are genes with similar sequences and functions across different species.
- **Methods:** Designed the algorithm utilizing dynamic programming and hidden Markov models (HMM) to enhance accuracy and efficiency of ortholog identification. Implemented maximum likelihood estimation (MLE) for parameter tuning in HMM, optimizing its performance.

ADDITIONAL EXPERIENCE

Legal Initiatives of Vietnam Remote
Paralegal Assistant *Dec 2023 - Present*

- Conduct legal research on the current political strategies and policies implemented by Vietnamese authorities.
- Publish opinions on critical political issues via the affiliated newspaper "Luat Khoa Tap Chi".

Beloit Math and CS Club Beloit, WI
Co-founder and President *Aug 2021 - Present*

- Updated students on field-related opportunities such as research projects, internships, and employment.
- Set preparatory sessions for undergraduate competitions like the Mathematical Contest in Modeling and Putnam

Beloit College Beloit, WI
Division III Athlete, Cross Country Team *Aug 2021 - Present*

SKILLS

Programming and Software: Python, MATLAB, R, LaTeX, QGIS, PostgreSQL, PostGIS, ArcGIS
Libraries and Frameworks:

- ***Python:*** NumPy, SciPy, Matplotlib, TensorFlow/PyTorch, Pandas, SimPy, geopandas, shapely, Fiona, SEABORN, rasterio, Brigthway2, PyLEnM, sscikit-learn, folium
- ***MATLAB:*** Simulink
- ***R:*** ggplot2, dplyr, tidyr