

VU ANH LE

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EDUCATION

Beloit College

Beloit, WI

Bachelor of Science, Mathematics. Grade: 4.0/4.0

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, Human Biology

AWARDS AND HONORS

Presidential Scholarship , Beloit College, Awards 48,000 USD annually	<i>Aug 2021 - May 2025</i>
Board of Trustees Grant , Beloit College, Awards 10,000 USD annually	<i>Aug 2021 - May 2025</i>
Dean's list , Beloit College	<i>Every semester</i>
MIT Summer Research Program , Massachusetts Institute of Technology	<i>June 2024</i>
Semi Finalist , InSPiR2eS Global Pitching Research Competition 2023 (IGPRC 2023)	<i>Jan 2024</i>
Station1 Frontiers Fellowship , Massachusetts Institute of Technology, Awards 13,500 USD	<i>June 2023</i>
National Research Grant , Vietnam's Ministry of Finance, Awards 10,000 USD	<i>Jan 2023</i>
Friends of UTokyo Scholarship , The University of Tokyo, Awards 4,000 USD	<i>Jun 2022</i>
Third Prize (Bronze Medal) , Vietnam Mathematical Olympiad	<i>Dec 2019</i>

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

- **PI**: 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 numerical simulations, utilizing partial differential equations (PDEs) like the advection-dispersion equation to model groundwater flow patterns. Incorporated factors such as hydraulic conductivity, porosity, dilution, and absorption. Used Principal Component Analysis (PCA) to identify key trends in environmental data for improved monitoring. 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
Research Assistant and Compliance Reporter, Remote Sensing Department

Hanoi, Vietnam
April 2020 - Present

- **PI:** Dr. Le Quoc Hung.
- **Project:** Monitoring human-induced land deformation processes 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
Summer Fellow, Station1 Frontiers Fellowship

Remote
June 2023 - Aug 2023

- **PI:** 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
Summer Intern, Graduate School of Frontier Sciences

Kashiwa, Chiba, Japan
April 2022 - Aug 2022

- **PI:** 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.

Beloit College
Research Assistant, Department of Biology

Beloit, WI
Aug 2021 - May 2023

- **PI:** Rachel Bergstrom.
- **Project:** Optimizing machine learning algorithms for seizure detection using scalp Electroencephalography (EEG) datasets in collaboration with the University of Wisconsin-Madison.
- **Methods:** Designed enhanced seizure prediction models using logistic regression and recurrent neural networks (RNNs), with a specific focus on long short-term memory (LSTM) networks. Implemented cross-validation techniques to ensure model robustness and generalizability across datasets of patients with diverse demographics and being diagnosed with Myoclonic and Absence seizures.

VOLUNTEER AND OUTREACH

Legal Initiatives of Vietnam
Paralegal Assistant

Remote
Dec 2021 - Present

- Conduct legal research on the design and implementation of policies in science, technology, environment, and energy by Vietnamese authorities.

Beloit Math and CS Club
Co-founder and President

Beloit, WI
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
Division III Athlete, Cross Country Team

Beloit, WI
Aug 2021 - Present

PRESENTATIONS

1. Le, Vu Anh. "Reliability Assessment of Land Subsidence Monitoring Results Using PSI Technique in Ho Chi Minh City, Vietnam."
 - Midstates Physical Sciences, Mathematics and Computer Science Undergraduate Research Symposium, *University of Chicago*, Nov 2023
 - Beloit College STEM Poster Session, *Beloit College*, Sep 2023
2. Le, Vu Anh. "Life Cycle Assessment of Biodegradable Plastic Packaging Subject to Comprehensive Organic Sorting."
 - Midstates Biological Sciences and Psychology Undergraduate Research Symposium, *Washington University at St. Louis*, Nov 2023
 - American Physician Scientist Association - Midwest Regional Meeting, *Saint Louis University School of Medicine*, Oct 2023
 - Station1 Frontier Fellowship Capstone Poster Event, *Station1*, Aug 2023
 - Beloit College STEM Poster Session, *Beloit College*, Sep 2023

SKILLS & INTERESTS

Research Interests: Partial Differential Equations, Numerical Linear Algebra, Autonomous Scientific Discovery

Programming and Software: Python, MATLAB, R, L^AT_EX, QGIS, PostgreSQL, PostGIS, ArcGIS

Libraries and Frameworks:

- **Python:** NumPy, SciPy, Matplotlib, TensorFlow/PyTorch, Pandas, SimPy, geopandas, shapely, Fiona, SEABORN, rasterio, Brighway2, PyLenM, ssikit-learn, folium
- **MATLAB:** Simulink
- **R:** ggplot2, dplyr, tidyr

REFERENCES

Haruko Murakami Wainwright

Mitsui Career Development Professor in Contemporary Technology

Assistant Professor of Nuclear Science and Engineering

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Mehmet Dik

Visiting Professor of Mathematics

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Beloit College, Beloit, WI, 53511

Chair, Department of Mathematics, Computer Science & Physics

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