VU ANH LE

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RESEARCH INTERESTS

Statistical Mechanics; Stochastic Processes; Bayesian Inference; Markov Chains; Formal Theory and Measurements of State Response and Accountability; Evidenced-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

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:** Developing statistical models for groundwater flow and contaminant transport dynamics to support long-term monitoring strategies at the Savannah River Site, a Department of Energy Superfund facility. Analyzed the impact of factors such as aquifer and well depth on contaminant mobility.
- **Methods:** Utilized the PyLEnM package for regression analysis, applied partial differential equations (PDEs) like the advection-dispersion equation, and 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 to improve prediction accuracy and reduce field sampling frequency.

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:** Conducting statistical analysis to monitor human-induced land deformation processes and assess the impact of hydroelectric power plants in Vietnam.
- **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, and employed geostatistical techniques like kriging to validate displacement maps. Utilized finite element methods (FEM) to simulate deformation processes caused by various 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.

Beloit College   Beloit, WI
Research Assistant, Department of Biology   *Aug 2021 - May 2023*
- **Research Advisor:** Prof. 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.

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*

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

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

REFERENCES

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