

Bailey Trang Nguyen

PHD STUDENT @ STANFORD · CAUSAL AI FOR MEDICINE

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Education

Stanford University

PHD OF COMPUTER SCIENCE

- Research topic: Causal AI for Medicine

Stanford, CA, USA

From Autumn 2024

Tokyo Institute of Technology

MASTER OF ARTIFICIAL INTELLIGENCE

- Advisor: Professor Naoaki Okazaki
- Thesis: Causal Reasoning through Two Cognition Layers for Improving Generalization in Visual Question Answering
- Overall GPA: 4.0/4.0

Tokyo, Japan

Spring 2022 - Spring 2024

Ho Chi Minh City University of Science

BACHELOR OF COMPUTER SCIENCE - ADVANCE PROGRAM

- Minors in Artificial Intelligence
- Thesis: Towards Robust Abstractive Text Summarization via Augmenting Essential Information
- Overall GPA: 3.72/4.0

Ho Chi Minh City, Vietnam

Fall 2017 - Fall 2021

Research Appointments

- 2024.9 - now **Stanford University, Dept. Computer Science**, Graduate Research Assistant
Advisor: Professor Ehsan Adeli (for Autumn 2024)
- 2024.2 - 2024.9 **National University of Singapore, School of Medicine**, Research Assistant
Advisor: Professor Dianbo Liu
- 2022.4-2024.4 **Tokyo Institute of Technology, Dept. Computer Science**, Graduate Research Assistant
Advisor: Professor Naoaki Okazaki
- 2021.5-2024.2 **Mila - Quebec AI Institute**, AI Research Intern
Advisors: Professor Yoshua Bengio and Professor Dianbo Liu
- 2021.5-2023.5 **FPT AI Residency Program, Vietnam**, AI Resident
Advisors: Dr. Khuong Nguyen and Dr. Phong Nguyen
- 2019.8-2021.5 **Ho Chi Minh City University of Science, Dept. Knowledge Engineering**, Undergraduate Research Assistant
Advisor: MSc Nhi Tran

Publications

(*) Co-first authors; (**) Co-last authors; (†) Mentee

PUBLISHED

- [5] **Trang Nguyen**, Amin Mansouri, Kanika Madan, Khuong Nguyen, Kartik Ahuja, Dianbo Liu, and Yoshua Bengio. [Reusable Slotwise Mechanisms](#). **NeurIPS 2023** - The 37th Conference on Neural Information Processing Systems
- [4] **Trang Nguyen** and Naoaki Okazaki. [Causal Reasoning through Two Cognition Layers for Improving Generalization in Visual Question Answering](#). **EMNLP 2023** Long-Main track - The 2023 Conference on Empirical Methods in Natural Language Processing
- [3] **Trang Nguyen**, Alexander Tong, Kanika Madan, Yoshua Bengio**, and Dianbo Liu**. [Causal Discovery in Gene Regulatory Networks with GFlowNet: Towards Scalability in Large Systems](#). **GenBio@NeurIPS 2023** - Generative AI and Biology Workshop at The 37th Conference on Conference on Neural Information Processing Systems
- [2] **Trang Nguyen**, Nam Van, and Nhi Tran. [Performance-Driven Reinforcement Learning Approach for Abstractive Summarization](#). **PRICAI 2021** - The Pacific Rim International Conference on Artificial Intelligence
- [1] **Trang Nguyen** and Nhi Tran. [Contour: Penalty and Spotlight Masks for Abstractive Summarization](#). **ACIIDS 2020** - Asian Conference on Intelligent Information and Database Systems

UNDER-REVIEW

- [2] Xiaoye Wang*, Nicole Xi Zhang*, Hongyu He, **Trang Nguyen**, Kun-Hsing Yu, ..., James Zou, and Dianbo Liu. *Safety challenges of AI in medicine*. **Lancet Digital Health** (Submitted on March 2024)
- [1] Minh Ngoc Nguyen*, Tan-Hanh Pham*, Khai Le-Duc*, **Trang Nguyen**, ..., Viktor Dremina, and Sergei Sokolovskya. *A Wearable Device Dataset for Mental Health Assessment Using Laser Doppler Flowmetry and Fluorescence Spectroscopy Sensors*. **ICDM 2024** - The 24th IEEE International Conference on Data Mining

IN PREPS

- [2] **Trang Nguyen**, Rosemary Nan Ke, and Dianbo Liu. *Enhancing Out-of-distribution Generalization in AI for Healthcare through Time-Varying Counterfactual Learning*. **Wrapping for NEJM-AI** - The New England Journal of Medicine - AI Track
- [1] Thi Nguyen†, **Trang Nguyen**, and Dianbo Liu. *Improving Generalization in 3D Protein Representation*. **Target to ICLR 2025** - The 21st International Conference on Learning Representations

PREPRINT

- [1] Ayush K Chakravarthy, **Trang Nguyen**, Anirudh Goyal, Yoshua Bengio**, and Michael Mozer**. [Spotlight Attention: Robust Object-Centric Learning With a Spatial Locality Prior](#).

Awards, Fellowships, & Grants

2024-2025	School of Engineering Graduate Fellowship , Stanford University
	EDGE: Enhancing Diversity in Graduate Education , Stanford University
2022-2024	Honda Y-E-S Award , Honda Foundation for Graduate Study in Japan
2017-2021	Le So Memorial Scholarship of Excellence , Sunflower Mission, USA

Research Experience

National University of Singapore - School of Medicine

Singapore

ADVISOR: PROFESSOR DIANBO LIU

Feb 2024 - Sept 2024

- Project: “Enhancing OOD Generalization in AI for Healthcare through Time-Varying Counterfactual Learning”
 - Proposing a time-varying counterfactual learning framework for improving generalization ability in out-of-distribution (OOD) and distribution-shift, addressing the issue of biases and data imbalance in healthcare.
 - Working on the real-world healthcare dataset, MIMIC-III, to validate and refine the proposed framework.
 - Leading the execution of experiments, which involved selecting appropriate baselines and datasets, implementing the proposed method, designing ablation studies, and analyzing results.
- Project: “Causal Discovery in Gene Regulatory Networks with GFlowNet: Towards Scalability in Large Systems”
 - Proposed a variable-wise influence concept to enhance causal understanding and scalability in large, intricate biological systems.
 - Led the execution of experiments, including selecting appropriate baselines and datasets, implementing the proposed method, designing ablation studies, and analyzing results.
 - Outperformed baselines in small-scale experiments and achieved comparable or superior performance in large-scale gene networks exceeding 1,000 nodes, while also reducing inference time.
- Project: “Improving Generalization in 3D Protein Representation” (still in early state)
 - Investigating a novel architecture for 3D protein representation to improve generalization and accuracy in protein structure prediction.
 - The target model can capture complex 3D spatial relationships, enhance feature extraction, and improve prediction robustness, further facilitating drug discovery and protein engineering for real-world applications.
 - Mentoring a research intern in research methodologies and fostering innovative research ideas.
- Co-organized the [AI Tea Talk Singapore](#), an online talk series on general AI topics.

Mila - Quebec AI Institute

Quebec, Canada

CO-ADVISORS: PROFESSOR YOSHUA BENGIO AND PROFESSOR DIANBO LIU

May 2021 - Feb 2024

- Project: “*Reusable Slotwise Mechanisms*”
 - Proposed to enhance generalization by relaxing the inductive biases in object slot communication.
 - Led the execution of experiments, including selecting appropriate baselines and datasets, implementing the proposed method, designing ablation studies, and analyzing results.
 - Outperformed baselines on video prediction, visual question answering, and action planning tasks in both IID and OOD scenarios.
- Project: “*Causal Discovery in Gene Regulatory Networks with GFlowNet: Towards Scalability in Large Systems*”
 - Collaborated with the Research Assistant position at the National University of Singapore.
- Project: “*Spotlight Attention: Robust Object-Centric Learning With a Spatial Locality Prior*”
 - Participated in the initialization of approaches and the selection of baselines.
 - Conducted a portion of the experiments for downstream tasks.
- Participated in reading groups hosted by Mila, University of Montreal, and McGill University.

Tokyo Institute of Technology - Department of Computer Science

Tokyo, Japan

ADVISOR: PROFESSOR NAOAKI OKAZAKI

Apr 2022 - Apr 2024

- Thesis: “*Causal Reasoning through Two Cognition Layers for Improving Generalization in Visual Question Answering*”
 - Proposed a counterfactual learning approach with two mediators to address distribution-shift challenges.
 - Led the execution of experiments, including selecting baselines and datasets, implementing the proposed method, designing ablation studies, and analyzing results.
 - Outperformed three baselines across four datasets, achieved new state-of-the-art results on the PathVQA dataset, and significantly improved generalization on the VQA-CPv2 dataset.
- Attended and presented at internal reading groups and research seminars.

FPT AI Residency Program

Ho Chi Minh City, Vietnam

ADVISORS: DR. KHUONG NGUYEN AND DR. PHONG NGUYEN

May 2021 - May 2023

- Primarily engaged with the Mila team.
- Delivered talks on System 2, Causal Discovery, and research opportunities for Vietnamese students.

Ho Chi Minh City University of Science - Department of Knowledge Engineering

Ho Chi Minh City, Vietnam

ADVISOR: MSc. NHI TRAN

Aug 2019 - May 2021

- Projects: “*Contour: Penalty and Spotlight Masks for Abstractive Summarization*” and “*Performance-Driven Reinforcement Learning Approach for Abstractive Summarization*”
 - Proposed supervised and unsupervised masks for abstractive text summarization to highlight context-relevant information in each word prediction turn, improving output explainability.
 - Led experimental execution, including selecting baselines and datasets, implementing the proposed method, designing ablation studies, and analyzing results.