Trang Nguyen

PhD Student @ Stanford · Causal AI for Medicine

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Education

Stanford University *Stanford, CA, USA*
PhD of Computer Science *From Autumn 2024*
- Research topic: Causal AI for Medicine

Tokyo Institute of Technology *Tokyo, Japan*
Master of Artificial Intelligence *Spring 2022 - Spring 2024*
- Advisor: Professor Naoaki Okazaki
- Thesis: Causal Reasoning through Two Cognition Layers for Improving Generalization in Visual Question Answering
- Overall GPA: 4.0/4.0

Ho Chi Minh City University of Science *Ho Chi Minh City, Vietnam*
Bachelor of Computer Science - Advance Program *Fall 2017 - Fall 2021*
- Minors in Artificial Intelligence
- Thesis: Towards Robust Abstractive Text Summarization via Augmenting Essential Information
- Overall GPA: 3.72/4.0

Research Appointments

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*. **Target to ICLR 2025** - The 21st International Conference on Learning Representations

[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 - now*

- 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 focusing 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 2023*

- 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.