DUY-TUNG PHAM

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EDUCATION

Hanoi University of Science and Technology (HUST)　　　　　　　　　　2020 - 2024
Bachelor of Science in Computer Science (Honors Program), CPA: 3.91/4.00, ranked 2nd in program.
Thesis: Fine-grained Neural Topic Modeling, resulting in a paper accepted to Findings of EMNLP 2024.

High School for Gifted Students, Hanoi University of Education　　　　　2017 - 2020
Mathematics Gifted Class, GPA: 9.6/10.0.

RESEARCH EXPERIENCE

AI Research Resident　　　　　　　　　　　　　　　　　　　　　　Jun 2024 - Present
FPT Software AI Center　　　　　　　　　　　　　　　　　　　　　　　*Hanoi, Vietnam*

- Advisors: Prof. Thieu Vo, Prof. Tan Nguyen
- Research topic: Properties of Foundation Model (Transformer, Mixture of Experts, Mamba), Optimal Transport.
- 4 accepted papers at ICLR, ICML, and NeurIPS.

Undergraduate Research Student　　　　　　　　　　　　　　　　　Dec 2021 - Jul 2024
DSLab, HUST　　　　　　　　　　　　　　　　　　　　　　　　　　　*Hanoi, Vietnam*

- Advisors: Dr. Linh Ngo Van, Prof. Khoat Than
- Research topic: Variational Inference, Bayesian Neural Network, Topic Modeling.
- 3 accepted papers at EMNLP and Neurocomputing journal.

PUBLICATIONS

- **Dynamical Properties of Tokens in Self-Attention and Effects of Positional Encoding**
  Duy-Tung Pham*, An Nguyen The*, Viet-Hoang Tran, Nhan-Phu Chung, Xin T. Tong, Tan Minh Nguyen**, Thieu Vo**.
  Conference on Neural Information Processing Systems (NeurIPS, rank A*), 2025.

- **TopiCOT: Neural Topic Model Aligning with Pre-trained Clustering and Optimal Transport**
  Tung Nguyen*, **Duy-Tung Pham***, Quang Duc Nguyen, Linh Ngo Van, Anh Nguyen Duc, Sang Dinh Viet.
  Neurocomputing (Q1 journal, IF 5.5), 2025.

- **Equivariant Polynomial Functional Networks**
  Thieu N. Vo*, Viet-Hoang Tran*, Tho Tran Huu, An Nguyen The, Thanh Tran, Minh-Khoi Nguyen-Nhat, **Duy-Tung Pham**, Tan Minh Nguyen.
  International Conference on Machine Learning (ICML, rank A*), 2025.

- **Demystifying the Token Dynamics of Deep Selective State Space Models**
  Thieu Vo, **Duy-Tung Pham**, Xin T. Tong**, Tan Minh Nguyen**.
  International Conference on Learning Representations (ICLR, rank A*, **spotlight**), 2025.

- **Equivariant Neural Functional Networks for Transformers**
  Hoang V. Tran*, Thieu Vo*, An Nguyen The*, Tho Tran Huu, Minh-Khoi Nguyen-Nhat, Thanh Tran, **Duy-Tung Pham**, Tan Minh Nguyen.
  International Conference on Learning Representations (ICLR, rank A*), 2025.

- **Out-of-Vocabulary Handling and Topic Quality Control Strategies in Streaming Topic Models**
  Tung Nguyen*, **Duy-Tung Pham***, Linh Ngo Van, Ha-Bang Ban, Khoat Than.
  Neurocomputing (Q1 journal, IF 5.5), 2025.

- **NeuroMax: Enhancing Neural Topic Modeling via Maximizing Mutual Information and Group Topic Regularization**
  Duy-Tung Pham*, Trang Nguyen*, Tung Nguyen*, Linh Ngo Van, Duc Anh Nguyen, Thien Huu Nguyen.
  Findings of The Conference on Empirical Methods in Natural Language Processing (EMNLP, rank A*), 2024.

(*) denotes equal contribution, (**) denotes equal advising.

RESEARCH INTEREST

I study the *mathematical foundations* of *deep learning*, focusing on *geometric* and *dynamical* perspectives to design *efficient*, *scalable*, and *robust* models from first principles.

PROFESSIONAL SERVICES

Reviewer at ICLR 2025, ICLR 2026.

SCHOLARSHIPS

- **Academic Achievement Scholarship - HUST** (6/7 semesters): Awarded to the top 3% of students with outstanding academic performance each semester.
- **Scholarship from the National Key Program for Mathematical Development** (2018): Awarded by the Vietnam Institute for Advanced Studies in Mathematics (VIASM) to high school students demonstrating exceptional excellence and strong potential in mathematics.

RELEVANT COURSES AND CERTIFICATES

- **University Courses**: Calculus 1, 2, 3; Algebra; Optimization Methods; Discrete Mathematics; Probability and Statistics; Introduction to AI; Machine Learning (all achieved 4.0/4.0).
- **Language**: English (IELTS 7.5 Overall - Listening 8.5, Reading 8.5, Writing 6.5, Speaking 6.0), Vietnamese (Native).

PRESENTATIONS

- *Demystifying the Token Dynamics of Deep Selective State Space Models*. ICLR 2025 Spotlight. Singapore.
- *Bayesian Neural Network*. Weekly seminar, DSLab, HUST. Hanoi, Vietnam, 2024.

HONORS AND AWARDS

- **SoICT Hackathon**, Routing Optimization Track (Oct 2023) - Finalist, Top 7.
- **ACM-ICPC**, Asia Hanoi Regional Contest (Mar 2022) - Third Prize.
- **Vietnam Olympiad of Informatics** for Undergraduate Students (Dec 2020) - Second Prize.
- **Hanoi Math Modeling Online Contest** (Jul 2020) - First Prize.
- **Vietnam Mathematical Olympiad** for High School Students (Jan 2019) - Third Prize.

ACTIVITIES

- **Mentor, MaSSP, Applied Mathematics**   Jul 2023 - Aug 2023

  Guided 4 high school students in a financial math project on fraud detection, covering data handling, modeling, evaluation, and presentation.

- **Academic Assistant, Hanoi Math Modeling Competition**   Jun 2021 - May 2022

  Guided teams in real-world problem modeling using linear/integer programming and time series methods, assisting in formulation, analysis, and presentations.

- **Mentee, PiMA Research Summer Camp**   Jul 2021 - Aug 2021

  Researched and implemented Locally Linear Embedding (LLE) for image compression, exploring theory and variants.

- **Mentee, MaSSP, Data Science and Machine Learning**   Jun 2021

  Completed intensive coursework and applied skills analyzing COVID-19 patient data.

- **Participant, VIASM Mathematical Summer School**   Jul 2019

  Attended advanced problem-solving training for Mathematics Olympiad preparation.

REFERENCES

- **Prof. Tan Nguyen**, Assistant Professor (Presidential Young Professor), National University of Singapore.
  Email: tanmn@nus.edu.sg. Homepage: https://tanmnguyen89.github.io/
- **Prof. Thieu Vo**, Lecturer (eq., Assistant Professor), University of Bath, United Kingdom.
  Email: ntv22@bath.ac.uk. Homepage: https://sites.google.com/tdtu.edu.vn/vongocthieu
- **Prof. Xin. T. Tong**, Associate Professor, National University of Singapore.
  Email: xin.t.tong@nus.edu.sg. Homepage: https://sites.google.com/view/xintongthomson/home
- **Dr. Linh Ngo Van**, Lecturer (eq., Assistant Professor), Hanoi University of Science and Technology, Vietnam.
  Email: linhnv@soict.hust.edu.vn. Homepage: https://users.soict.hust.edu.vn/linhnv/