Huy Minh Nguyen

CONTACT INFORMATION	**Phone:** (+1) 571-356-7068 **Email:** huynm@utexas.edu **Homepage:** https://huynm99.github.io/

EDUCATION

The University of Texas at Austin, Texas, USA.   2022-2027
Ph.D Student in Statistics at the Department of Statistics and Data Sciences.

- Advisor: Professor Nhat Ho.

- GPA: 4.0/4.0

Ho Chi Minh University of Science, Ho Chi Minh City, Vietnam.   2017–2020
Bachelor of Science in Mathematics and Computer Science, Honor Program.

- Supervisor: Professor Dang Duc Trong.

- GPA: 9.75/10.0 - *Summa Cum Laude*.

RESEARCH EXPERIENCE

The University of Texas at Austin, Texas, USA.   2023-Present
Graduate Research Assistant.

- Research topics: Convergence Rate of Maximum Likelihood Estimation (MLE) under Finite Mixture of Experts.

- Advisor: Professor Nhat Ho.

VinAI Research, Hanoi, Vietnam.   2020–2022
AI Research Resident.

- Research topics: Optimal Transport theory and its applications in Domain Adaptation.

- Skill gained: Did research on Optimal Transport (Sinkhorn algorithms, Barycenter computation, etc) and applied them to study Data Shift and Label Shift problems in Domain Adaptation.

RESEARCH INTERESTS

My current research focuses on theoretical foundations for Mixture-of-Experts models. In particular, I try to comprehend the effects of different gating functions (namely softmax, top-K sparse, etc) on the convergence of density estimation and parameter estimation under the Mixture-of-Experts models. Based on insights from these results, I aim to design novel gating functions which help improve the performance of Mixture-of-Experts applications, including Large Language Models.

PUBLICATIONS

- **Huy Nguyen**, TrungTin Nguyen, Nhat Ho. Demystifying Softmax Gating in Gaussian Mixture of Experts.
  - *37th Conference on Neural Information Processing Systems (NeurIPS 2023).*
  - **Spotlight**: Top 2%.

- Dat Do*, **Huy Nguyen***, Khai Nguyen, Nhat Ho. Minimax Optimal Rate for Parameter Estimation in Multivariate Deviated Models.
  - *37th Conference on Neural Information Processing Systems (NeurIPS 2023).*

- Khai Nguyen, Tongzheng Ren, **Huy Nguyen**, Litu Rout, Tan Nguyen, Nhat Ho. Hierarchical Sliced Wasserstein Distance.
  - *11th International Conference on Learning Representations (ICLR 2023).*

- **Huy Nguyen***, Khang Le*, Dung Le*, Dat Do, Tung Pham, Nhat Ho. Entropic Gromov-Wasserstein between Gaussian Distributions.
  - *39th International Conference on Machine Learning (ICML 2022).*

- **Huy Nguyen***, Khang Le*, Khai Nguyen, Tung Pham, Nhat Ho. On Multimarginal Partial Optimal Transport: Equivalent Forms and Computational Complexity.
  - *25th International Conference on Artificial Intelligence and Statistics (AISTATS 2022).*

- **Huy Nguyen***, Khang Le*, Quang Minh Nguyen, Tung Pham, Hung Bui, Nhat Ho. On Robust Optimal Transport: Computational Complexity and Barycenter Computation.
  - *35th Conference on Neural Information Processing Systems (NeurIPS 2021).*

- Thu Nguyen, Duy H. M. Nguyen, **Huy Nguyen**, Binh T. Nguyen, Bruce A. Wade. EPEM: Efficient Parameter Estimation for Multiple Class Monotone Missing Data.
  - *Information Sciences Journal, Volume 567, page 1-22.*

PREPRINTS

- **Huy Nguyen**, Pedram Akbarian, Fanqi Yan, Nhat Ho. Statistical Perspective of Top-K Sparse Softmax Gating Mixture of Experts. *Under review, arXiv:2309.13850.*

- **Huy Nguyen***, TrungTin Nguyen*, Khai Nguyen, Nhat Ho. Towards Convergence Rates for Parameter Estimation in Gaussian-gated Mixture of Experts. *Under review, arXiv:2305.07572.*

- **Huy Nguyen**, Khai Nguyen, Nhat Ho. On Parameter Estimation in Gaussian Deviated Mixture of Experts. *Under review.*

- Dung Le*, **Huy Nguyen***, Khai Nguyen*, Trang Nguyen, Nhat Ho. Fast Approximation of the Generalized Sliced-Wasserstein Distance .
  - *ICML 2023 Workshop on New Frontiers in Learning, Control, and Dynamical Systems.*

- Trung Le, Dat Do, Tuan Nguyen, **Huy Nguyen**, Hung Bui, Nhat Ho, Dinh Phung. On Label Shift in Domain Adaptation via Wasserstein Distance. *Under review, arXiv:2110.15520.*

TEACHING EXPERIENCE

The University of Texas at Austin, Texas, USA.
Teaching Assistant at the Department of Statistics and Data Sciences.

- SDS302F - Foundations of Data Analysis.   Fall 2022
- SDS322E - Elements of Data Science.   Spring 2023
- SDS320E - Elements of Statistics.   Fall 2023

PROFESSIONAL SERVICES

- Reviewer at the International Conference on Machine Learning (ICML) 2022.

- Reviewer at the Conference on Neural Information Processing Systems (NeurIPS) 2022-2023.

- Reviewer at the International Conference on Artificial Intelligence and Statistics (AISTATS) 2022-2024.

- Reviewer at the International Conference on Learning Representations (ICLR) 2024.

- Reviewer at the New Frontiers in Learning, Control, and Dynamical Systems Workshop (ICML) 2023.

HONORS AND AWARDS

- **Doctoral Fellowship** of the University of Texas at Austin.   2022
- Class of 2020 **Valedictorian** of Ho Chi Minh University of Science (HCMUS).   2020
  - Graduated 1 year earlier with the highest GPA ever in HCMUS, at 9.75/10.0.

- **Merit Scholarship** for gifted students in Mathematics.   2018, 2019
  - Granted by Vietnam Institute for Advanced Study in Mathematics (VIASM).

- **Gold medal** in Algebra, Vietnam Mathematics Olympiad for undergraduate students.   2019
  - Organized by Vietnam Mathematical Society (VMS).

- **Bronze medal** in Analysis, Vietnam Mathematics Olympiad for undergraduate students. 2019
  - Organized by Vietnam Mathematical Society (VMS).

- **Full Scholarship** of Ho Chi Minh University of Science.   2017
  - Only for a student having the highest score in the university entrance examination.

TECHNICAL
SKILLS

- *System*: MacOS, Linux, Windows.

- *Programming Languages*: Python (Pytorch, Sci-kit Learn, Numpy, Matplotlib), R, MATLAB.

- *Softwares*: LaTeX, Microsoft Offices.

LANGUAGES

- **English**: Proficient.

- **Vietnamese**: Native.