

## CONTACT INFORMATION

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## EDUCATION

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

- Advisors: Professor [Nhat Ho](#) and Professor [Alessandro Rinaldo](#).
- 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.

- Advisor: Professor [Dang Duc Trong](#).
- GPA: 9.75/10.0 - *Summa Cum Laude*.

## RESEARCH EXPERIENCE

**Microsoft AI**, Redmond, WA, USA. Summer 2024  
 Research Intern.

- Research topics: Applications of Mixture of Experts in Large Language Models.
- Propose a method for selecting crucial attention heads in the multi-head mechanism based on the routing strategy in mixture of experts to improve the efficiency of the Large Language Models.

**The University of Texas at Austin**, Austin, TX, USA. 2024-Present  
 Graduate Research Assistant.

- Research topic: Mixture of Experts: From Theory to Applications.
- Supervisors: Professor [Nhat Ho](#) and Professor [Alessandro Rinaldo](#).

**VinAI**, 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 research focuses on four important aspects of Mixture-of-Experts (MoE) models, including Scalability (effective sparse MoE in large language models), Heterogeneity (MoE in multi-modal learning), Efficiency (MoE in parameter-efficient fine-tuning, namely low-rank adaptation and prompt-based tuning), and Interpretability (theoretical understandings of gating mechanism and expert structures). Additionally, I am also interested in Optimal Transport problems.

## PUBLICATIONS

23. **Huy Nguyen**, Pedram Akbarian\*, Trang Pham\*, Trang Nguyen\*, Shujian Zhang, Nhat Ho. [Statistical Advantages of Perturbing Cosine Router in Mixture of Experts](#). *In International Conference on Learning Representations, 2025*.
22. Nghiem Tuong Diep\*, **Huy Nguyen\***, Chau Nguyen, Minh Le, Duy Minh Ho Nguyen, Daniel Sonntag, Mathias Niepert, Nhat Ho. [On Zero-Initialized Attention: Optimal Prompt and Gating Factor Estimation](#). *Proceedings of the International Conference on Machine Learning, 2025*.
21. Tuan Truong\*, Chau Nguyen\*, **Huy Nguyen\***, Minh Le, Trung Le, Nhat Ho. [RepLoRA: Reparameterizing Low-rank Adaptation via the Perspective of Mixture of Experts](#). *Proceedings of the International Conference on Machine Learning, 2025*.

20. Minh Le\*, Chau Nguyen\*, **Huy Nguyen\***, Quyen Tran, Trung Le, Nhat Ho. [Revisiting Prefix-tuning: Statistical Benefits of Reparameterization among Prompts](#). *In International Conference on Learning Representations, 2025*.
19. Fanqi Yan\*, **Huy Nguyen\***, Dung Le\*, Pedram Akbarian, Nhat Ho\*\*, Alessandro Rinaldo\*\*. [On Minimax Estimation of Parameters in Softmax-Contaminated Mixture of Experts](#). *Advances in Neural Information Processing Systems, 2025*.
18. **Huy Nguyen**, Nhat Ho\*\*, Alessandro Rinaldo\*\*. [Sigmoid Gating is More Sample Efficient than Softmax Gating in Mixture of Experts](#). *Advances in Neural Information Processing Systems, 2024*.
17. Xing Han, **Huy Nguyen\***, Carl Harris\*, Nhat Ho, Suchi Saria. [FuseMoE: Mixture-of-Experts Transformers for Fleximodal Fusion](#). *Advances in Neural Information Processing Systems, 2024*.
16. Minh Le, An Nguyen\*, **Huy Nguyen\***, Trang Nguyen\*, Trang Pham\*, Linh Van Ngo, Nhat Ho. [Mixture of Experts Meets Prompt-Based Continual Learning](#). *Advances in Neural Information Processing Systems, 2024*.
15. **Huy Nguyen**, Nhat Ho\*\*, Alessandro Rinaldo\*\*. [On Least Square Estimation in Softmax Gating Mixture of Experts](#). *Proceedings of the International Conference on Machine Learning, 2024*.
14. **Huy Nguyen**, Pedram Akbarian, Nhat Ho. [Is Temperature Sample Efficient for Softmax Gaussian Mixture of Experts?](#) *Proceedings of the International Conference on Machine Learning, 2024*.
13. **Huy Nguyen**, Pedram Akbarian, TrungTin Nguyen, Nhat Ho. [A General Theory for Softmax Gating Multinomial Logistic Mixture of Experts](#). *Proceedings of the International Conference on Machine Learning, 2024*.
12. **Huy Nguyen**, Pedram Akbarian, Fanqi Yan, Nhat Ho. [Statistical Perspective of Top-K Sparse Softmax Gating Mixture of Experts](#). *In International Conference on Learning Representations, 2024*.
11. Fanqi Yan\*, **Huy Nguyen\***, Dung Le\*, Pedram Akbarian, Nhat Ho. [Understanding Expert Structures on Minimax Parameter Estimation in Contaminated Mixture of Experts](#). *In International Conference on Artificial Intelligence and Statistics, 2025*.
10. **Huy Nguyen\***, TrungTin Nguyen\*, Khai Nguyen, Nhat Ho. [Towards Convergence Rates for Parameter Estimation in Gaussian-gated Mixture of Experts](#). *In International Conference on Artificial Intelligence and Statistics, 2024*.
9. **Huy Nguyen**, Khai Nguyen, Nhat Ho. [On Parameter Estimation in Gaussian Deviated Mixture of Experts](#). *In International Conference on Artificial Intelligence and Statistics, 2024*.
8. **Huy Nguyen**, TrungTin Nguyen, Nhat Ho. [Demystifying Softmax Gating Function in Gaussian Mixture of Experts](#). *Advances in Neural Information Processing Systems, 2023 (Spotlight, Top 3.6% out of 12343 submissions)*.
7. Dat Do\*, **Huy Nguyen\***, Khai Nguyen, Nhat Ho. [Minimax Optimal Rate for Parameter Estimation in Multivariate Deviated Models](#). *Advances in Neural Information Processing Systems, 2023*.
6. Dung Le\*, **Huy Nguyen\***, Khai Nguyen\*, Trang Nguyen\*, Nhat Ho. [Fast Approximation of the Generalized Sliced-Wasserstein Distance](#). *IEEE International Conference on Acoustics, Speech and Signal Processing, 2024*.
5. Khai Nguyen, Tongzheng Ren, **Huy Nguyen**, Litu Rout, Tan Nguyen, Nhat Ho. [Hierarchical Sliced Wasserstein Distance](#). *In International Conference on Learning Representations, 2023*.
4. **Huy Nguyen\***, Khang Le\*, Dung Le\*, Dat Do, Tung Pham, Nhat Ho. [Entropic Gromov-Wasserstein between Gaussian Distributions](#). *Proceedings of the International Conference on Machine Learning, 2022*.
3. **Huy Nguyen\***, Khang Le\*, Khai Nguyen, Tung Pham, Nhat Ho. [On Multimarginal Partial Optimal Transport: Equivalent Forms and Computational Complexity](#). *In International Conference on Artificial Intelligence and Statistics, 2022*.

2. **Huy Nguyen\***, Khang Le\*, Quang Minh Nguyen, Tung Pham, Hung Bui, Nhat Ho. [On Robust Optimal Transport: Computational Complexity and Barycenter Computation](#). *Advances in Neural Information Processing Systems*, 2021.
1. 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

10. **Huy Nguyen**, Thong T. Doan, Quang Pham, Nghi D. Q. Bui, Nhat Ho\*\*, Alessandro Rinaldo\*\*. [On DeepSeekMoE: Statistical Benefits of Shared Experts and Normalized Sigmoid Gating](#). *Under review*, *arXiv:2505.10860*.
9. Minh Le, Bao-Ngoc Dao **Huy Nguyen**, Quyen Tran, Anh Nguyen, Nhat Ho. [One-Prompt Strikes Back: Sparse Mixture of Experts for Prompt-based Continual Learning](#). *Under review*.
8. Nghiem T. Diep, Hien Dang, Tuan Truong, Tan Dinh, **Huy Nguyen**, Nhat Ho. [DoRAN: Stabilizing Weight-Decomposed Low-Rank Adaptation via Noise Injection and Auxiliary Networks](#). *Under review*.
7. Nghiem T. Diep, Dung Le, Tuan Truong, Tan Dinh, **Huy Nguyen**, Nhat Ho. [HoRA: Cross-Head Low-Rank Adaptation with Joint Hypernetworks](#). *Under review*.
6. **Huy Nguyen**, Nhat Ho\*\*, Alessandro Rinaldo\*\*. [Convergence Rates for Softmax Gating Mixture of Experts](#). *Under review*, *arXiv:2503.03213*.
5. **Huy Nguyen\***, Fanqi Yan\*, Pedram Akbarian, Nhat Ho\*\*, Alessandro Rinaldo\*\*. [Sigmoid Self-Attention has Lower Sample Complexity than Softmax Self-Attention: A Mixture-of-Experts Perspective](#). *Under review*, *arXiv:2502.00281*.
4. Minh Le, Anh Nguyen, **Huy Nguyen**, Chau Nguyen, Anh Tran, Nhat Ho. [Revisit Visual Prompt Tuning: The Expressiveness of Prompt Experts](#). *Under review*, *arXiv:2501.18936*.
3. **Huy Nguyen\***, Xing Han\*, Carl Harris, Suchi Saria\*\*, Nhat Ho\*\*. [On Expert Estimation in Hierarchical Mixture of Experts: Beyond Softmax Gating Functions](#). *Under review*, *arXiv:2410.02935*.
2. Pedram Akbarian\*, **Huy Nguyen\***, Xing Han\*, Nhat Ho. [Quadratic Gating Functions in Mixture of Experts: A Statistical Insight](#). *Under review*, *arXiv:2410.11222*.
1. Nam V. Nguyen, **Huy Nguyen**, Quang Pham, Van Nguyen, Savitha Ramasamy, Nhat Ho. [CompeteSMoE – Statistically Guaranteed Mixture of Experts Training via Competition](#). *Under review*, *arXiv:2505.13380*.

## PRESENTATIONS

5. Mixture of Experts in Large-scale and Multimodal Models. *MIT reading group hosted by Prof. Priya Donti, Virtual, 2025 (Invited talk)*.
4. Mixture of Experts in Large-scale and Multimodal Models. *Two Sigma PhD Fellowship Finalist Reception, Virtual, 2025 (Invited talk)*.
3. Mixture of Experts in Large-scale and Multimodal Models. *Dartmouth Applied and Computational Mathematics Seminar, Virtual, 2025 (Invited talk)*.
2. Demystifying Softmax Gating Function in Gaussian Mixture of Experts. *STATML@UT Reading Group, Austin, TX, 2024 (Invited talk)*.
1. Demystifying Softmax Gating Function in Gaussian Mixture of Experts. *IFML Workshop on Generative AI (Student talks session), Austin, TX, 2023 (Invited talk)*.

## TEACHING EXPERIENCE

**The University of Texas at Austin**, Austin, TX, 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
- SDS315 - Statistical Thinking. Spring 2025

PROFESSIONAL SERVICES	<b>Program Committee/Reviewer at</b> <ul style="list-style-type: none"> <li>the Electronic Journal of Statistics (<a href="#">EJS</a>).</li> <li>the Journal of Machine Learning Research (<a href="#">JMLR</a>).</li> <li>the Transactions on Machine Learning Research (<a href="#">TMLR</a>)</li> <li>the International Conference on Machine Learning (<a href="#">ICML</a>) 2022-2025.</li> <li>the Conference on Neural Information Processing Systems (<a href="#">NeurIPS</a>) 2022-2025.</li> <li>the International Conference on Artificial Intelligence and Statistics (<a href="#">AISTATS</a>) 2022-2026.</li> <li>the International Conference on Learning Representations (<a href="#">ICLR</a>) 2024-2026.</li> <li>the Association for the Advancement of Artificial Intelligence (<a href="#">AAAI</a>) 2025-2026.</li> </ul>
HONORS AND AWARDS	<ul style="list-style-type: none"> <li>Top Reviewer at NeurIPS 2024. 2024</li> <li>AISTATS 2024 Registration Grant. 2024</li> <li>ICLR 2024 Travel Award. 2024</li> <li>NeurIPS 2023 Scholar Award. 2023</li> <li>Doctoral Fellowship of the University of Texas at Austin. 2022</li> </ul>
TECHNICAL SKILLS	<ul style="list-style-type: none"> <li><i>System:</i> MacOS, Linux, Windows.</li> <li><i>Programming Languages:</i> Python (Pytorch, Sci-kit Learn, Numpy, Matplotlib), R, MATLAB.</li> </ul>
REFERENCES	<ul style="list-style-type: none"> <li><b>Nhat Ho.</b> Email: minhnhhat@utexas.edu (Advisor).</li> <li><b>Alessandro Rinaldo.</b> Email: alessandro.rinaldo@austin.utexas.edu (Advisor).</li> </ul>