

# Khai Nguyen

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## OVERVIEW

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I am a third-year Ph.D. candidate in Statistics at The University of Texas at Austin. My research focus has primarily been on probabilistic machine learning, statistics, and data sciences.

## EDUCATION

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| <b>The University of Texas at Austin</b>   | Texas, USA     |
| Ph.D. in Statistics at Department of Statistics and Data Sciences                      | 2021–Present   |
| – GPA: 3.97/4.0.   |                |
| – Advisors: Professor Nhat Ho and Professor Peter Mueller.                             |                |
| <b>Hanoi University of Science and Technology (HUST)</b>                               | Hanoi, Vietnam |
| B.Sc in Computer Science (5 years program)   | 2015–2020      |
| – Top: 1%, graduated with Excellent Degree.  |                |
| – Thesis: “Distributional Sliced-Wasserstein and Applications to Generative Modeling”. |                |

## EMPLOYMENT

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| <b>The Univeristy of Texas at Austin</b>   | Texas, USA                 |
| <i>Graduate Research Assistant</i>   | September, 2023 –May, 2024 |
| – Research topics: Effective and Scalable Transportation Metrics for Machine Learning, Statistics, and Data Sciences.  |                            |
| <b>Toyota InfoTech Labs</b>  | Mountain View, CA, USA     |
| <i>Research Intern</i>   | May, 2023 –August, 2023    |
| – Research topics: Transformer for battery-health prediction.  |                            |
| – Proposed Transformer with global-local decomposition framework.  |                            |
| <b>The Univeristy of Texas at Austin</b>   | Texas, USA                 |
| <i>Graduate Research Assistant</i>   | September, 2022 –May, 2023 |
| – Research topics: Large-scale Optimal Transport for Machine Learning.   |                            |
| <b>AT&amp;T Labs</b>   | Texas, USA                 |
| <i>Research Intern</i>   | June, 2022 –August, 2022   |
| – Research topics: User Browsing Behavior Analysis, Co-clustering.   |                            |
| – Proposed and implemented co-clustering algorithms to analyze user browsing behavior in PySpark on DataBricks.  |                            |
| <b>VinAI Research</b>  | Hanoi, Vietnam             |
| <i>AI Research Resident</i>  | 2019 –2021                 |
| – Research topics: Deep Generative Models, Optimal Transport.  |                            |
| – Advisor: Dr. Hung Bui (Director of VinAI Research).  |                            |
| – Did research on Deep Generative Models (VAEs, GANs, score matching, diffusion models) and improved them with Optimal Transport (sliced Wasserstein distance, Sinkhorn divergence). |                            |

## PUBLICATIONS

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(\*) denotes equal contribution,

Google Scholar: <https://scholar.google.com/citations?user=im5fNaQAAAAJ&hl=en>

1. T. T. Le, **K. Nguyen**, S. Sun, N. Ho, and X. Xie, “Integrating efficient optimal transport and functional maps for unsupervised shape correspondence learning”, in *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.
2. **K. Nguyen**, N. Bariletto, and N. Ho, “Quasi-Monte Carlo for 3D sliced Wasserstein”, *International Conference on Learning Representations (ICLR)*, 2024.
3. **K. Nguyen** and N. Ho, “Sliced Wasserstein estimation with control variates”, *International Conference on Learning Representations (ICLR)*, 2024.
4. T. Le, **K. Nguyen**, N. Ho, S. Sun, K. Han, and X. Xie, “Diffeomorphic deformation via sliced Wasserstein distance optimization for cortical surface reconstruction”, *International Conference on Learning Representations (ICLR)*, 2024.
5. M. Luong, **K. Nguyen**, N. Ho, R. Haf, D. Phung, and L. Qu, “Revisiting deep audio-text retrieval through the lens of transportation”, *International Conference on Learning Representations (ICLR)*, 2024.
6. H. Nguyen, **K. Nguyen**, and N. Ho, “On parameter estimation in deviated gaussian mixture of experts”, *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2024.
7. H. Nguyen, T. Nguyen, **K. Nguyen**, and N. Ho, “Towards convergence rates for parameter estimation in gaussian-gated mixture of experts”, *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2024.
8. **K. Nguyen** and N. Ho, “Energy-based sliced Wasserstein distance”, *Neural Information Processing Systems (NeurIPS)*, 2023.
9. **K. Nguyen**, T. Ren, and N. Ho, “Markovian sliced Wasserstein distances: Beyond independent projections”, *Advances in Neural Information Processing Systems (NeurIPS)*, 2023.
10. D. Le\*, H. Nguyen\*, **K. Nguyen\***, T. Nguyen, and N. Ho, “Fast approximation of the generalized sliced-Wasserstein distance”, *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2024.
11. X. Han, T. Ren, T. M. Nguyen, **K. Nguyen**, J. Ghosh, and N. Ho, “Robustify Transformers with robust kernel density estimation”, *Neural Information Processing Systems (NeurIPS)*, 2023.
12. D. Do, H. Nguyen, **K. Nguyen**, and N. Ho, “Minimax optimal rate for parameter estimation in multivariate deviated models”, *Neural Information Processing Systems (NeurIPS)*, 2023.
13. **K. Nguyen\***, D. Nguyen\*, and N. Ho, “Self-attention amortized distributional projection optimization for sliced Wasserstein point-clouds reconstruction”, *International Conference on Machine Learning (ICML)*, 2023.
14. **K. Nguyen**, T. Ren, H. Nguyen, L. Rout, T. Nguyen, and N. Ho, “Hierarchical sliced Wasserstein distance”, *International Conference on Learning Representations (ICLR)*, 2023.
15. D. Nguyen, T. Nguyen, **K. Nguyen**, D. Phung, H. Bui, and N. Ho, “Model fusion of heterogeneous neural networks via cross-layer alignment”, *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2023.

16. **K. Nguyen** and N. Ho, “Revisiting sliced Wasserstein on images: From vectorization to convolution”, *Neural Information Processing Systems (NeurIPS)*, 2022.
17. **K. Nguyen** and N. Ho, “Amortized projection optimization for sliced Wasserstein generative models”, *Neural Information Processing Systems (NeurIPS)*, 2022.
18. T. Nguyen, M. Pham, T. Nguyen, **K. Nguyen**, S. J. Osher, and N. Ho, “Transformer with Fourier integral attentions”, *Neural Information Processing Systems (NeurIPS)*, 2022.
19. T. Nguyen, T. Nguyen, H. Do, **K. Nguyen**, V. Saragadam, M. Pham, K. Nguyen, N. Ho, and S. J. Osher, “Improving transformer with an admixture of attention heads”, *Neural Information Processing Systems (NeurIPS)*, 2022.
20. **K. Nguyen\***, D. Nguyen\*, T. Pham, and N. Ho, “Improving mini-batch optimal transport via partial transportation”, in *International Conference on Machine Learning (ICML)*, 2022.
21. **K. Nguyen**, D. Nguyen, Q. Nguyen, T. Pham, H. Bui, D. Phung, T. Le, and N. Ho, “On transportation of mini-batches: A hierarchical approach”, in *International Conference on Machine Learning (ICML)*, 2022.
22. K. Le, H. Nguyen, **K. Nguyen**, T. Pham, and N. Ho, “On multimarginal partial optimal transport: Equivalent forms and computational complexity”, in *International Conference on Artificial Intelligence and Statistics (AISTATS)*, PMLR, 2022, pp. 4397–4413.
23. S. Nguyen, D. Nguyen, **K. Nguyen**, K. Than, H. Bui, and N. Ho, “Structured dropout variational inference for bayesian neural networks”, *Neural Information Processing Systems (NeurIPS)*, 2021.
24. **K. Nguyen**, N. Ho, T. Pham, and H. Bui, “Distributional sliced-Wasserstein and applications to generative modeling”, in *International Conference on Learning Representations (ICLR)*, 2021.
25. **K. Nguyen**, S. Nguyen, N. Ho, T. Pham, and H. Bui, “Improving relational regularized autoencoders with spherical sliced fused Gromov-Wasserstein”, in *International Conference on Learning Representations (ICLR)*, 2021.

## PREPRINTS

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(\*) denotes equal contribution

1. **K. Nguyen** and N. Ho, “Hierarchical hybrid sliced Wasserstein: A scalable metric for heterogeneous joint distributions”, *Under Review*, 2024
2. **K. Nguyen**, S. Zhang, T. Le, and N. Ho, “Sliced Wasserstein with random-path projecting directions”, *Under Review*, 2024.

## PROFESSIONAL SERVICES

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- Reviewer at Journal of Machine Learning Research (JMLR).
- Reviewer at IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI).
- Reviewer at IEEE Transactions on Information Theory.
- Reviewer at Machine Learning Journal.
- Reviewer at International Conference on Machine Learning (ICML) 2021-2024.
- Reviewer at Workshop on Challenges in Deployable Generative AI (ICML) 2023.

- Reviewer at Conference on Neural Information Processing Systems (NeurIPS) 2021-2023.
- Reviewer at Workshop on Deep Generative Models (NeurIPS) 2021.
- Reviewer at International Conference on Learning Representations (ICLR) 2022-2024.
- Reviewer at International Conference on Artificial Intelligence and Statistics (AISTATS) 2022-2024.
- Reviewer at AAAI Conference on Artificial Intelligence (AAAI) 2023-2024.
- Reviewer at IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR) 2023-2024.
- Reviewer at International Conference on Computer Vision (ICCV) 2023.
- Reviewer at European Conference on Computer Vision (ECCV) 2024.
- Reviewer at IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2024.
- Reviewer at Conference on Language Modeling (COLM) 2024.

## AWARDS

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|---|------|
| • ICML 2023 Travel Grants (about \$2,000).            | 2023 |
| • Top Reviewer Award at NeurIPS 2022 (about \$1,000). | 2022 |
| • NeurIPS 2022 Scholar Award (about \$2,000).         | 2022 |
| • ICML 2022 Travel Grants (about \$2,000).            | 2022 |
| • UT Austin Doctoral Fellowship (about \$30,000).     | 2021 |

## TECHNICAL SKILLS

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- **Python:** Proficient.  
*Libraries: Pytorch (proficient), Tensorflow (basic), Scikit-Learn (proficient), Numpy (proficient), Pandas (basic), Matplotlib (proficient), Pyspark (basic), and so on.*
- **Developer Tools:** Git.
- **Systems:** Linux.