

# TrungTin Nguyen

## Curriculum Vitae (Short)

Postdoctoral Research Fellow  
The University of Queensland  
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📄 **Homepage:** [trung-tinnguyen.github.io](https://trung-tinnguyen.github.io)  
[Long CV Version](#), December 18, 2023



*"The book of nature is written in the language of mathematics." (Galileo G., 1890).*

*"Essentially, all models are wrong, but some are useful." (George E.P. Box, 1979).*

## Academic Appointment

- 2023–2024 **Postdoctoral Research Fellow**, [School of Mathematics and Physics](#), [University Of Queensland](#), Brisbane, Australia.  
**Topic:** Mathematical analysis of operator learning with artificial neural networks.  
**Mentors:** [Hien Duy Nguyen](#), and [Xin Guo](#).
- 2022–2023 **Postdoctoral Fellow**, [Statify Team](#), [Inria centre at the University Grenoble Alpes](#), [MIAI Grenoble Alpes](#), Grenoble, France.  
**Topic:** Bayesian model selection and simulated-based inference for complex and high-dimensional models.  
**Mentors:** [Florence Forbes](#), and [Julyan Arbel](#).

## Tertiary Education

- 2018–2021 **Doctor of Philosophy**, [Normandie Université](#), Caen, France.  
Major in Statistics and Data Science. Defended on December 14, 2021.  
**Thesis title:** [Model selection and approximation in high-dimensional mixture of experts models: from theory to practice](#).  
**Advisors:** [Faïcel Chamroukhi](#). **Rapporteurs:** [Sylvain Arlot](#), and [Judith Rousseau](#).  
**Committee members:** [Christophe Biernacki](#), [Hien Duy Nguyen](#), and [Gaëlle Chagny](#).
- 2017–2018 **Master of Science, Technology and Health**, [Université d'Orléans](#), Orléans, France, GPA: 18/20.  
Mention: *Très Bien*. Major in Applied Mathematics.  
**Thesis title:** Reinforcement learning for resource allocation problems using a partially observable Markov decision process.  
**Advisor:** [Le Thi Hoai An](#).
- 2013–2017 **Bachelor of Science**, [Vietnam National University-Ho Chi Minh University of Science \(VNU-HCM\)](#), Ho Chi Minh City, Vietnam, GPA: 9.17/10. Rank: 2/1557, Summa Cum Laude.  
Honors Program in Mathematics and Computer Science. Major in Probability and Statistics.  
**Thesis title:** Multiplicative censoring model.  
**Advisor:** [Dang Duc Trong](#).

## Research Interests

- Statistical learning** [Model selection](#) (minimal penalties and slope heuristics, non-asymptotic oracle inequalities), [simulation-based inference](#) (approximate Bayesian computation, Bayesian synthetic likelihood, method of moments), [Bayesian nonparametrics](#) (Gibbs-type priors, Dirichlet process mixture), [high-dimensional statistics](#) (variable selection via Lasso and penalization, graphical models), [uncertainty estimation](#).
- Machine learning** [Supervised learning](#) (deep hierarchical mixture of experts, deep neural networks), [unsupervised learning](#) (clustering via mixture models, dimensionality reduction via principal component analysis, deep generative models via variational autoencoders, generative adversarial networks and normalizing flows), [reinforcement learning](#) (partially observable Markov decision process).

- Optimization** [Robust and effective optimization algorithms for mixture models](#) (expectation–maximization, variational Bayesian expectation–maximization, Markov chain Monte Carlo methods), [difference of convex algorithm](#), [optimal transport](#) (Wasserstein distance, voronoi loss function).
- Applications** [Natural language processing](#) (large language model), [remote sensing](#) (planetary science, e.g., retrieval of Mars surface physical properties from hyper-spectral images), [audio processing](#) (sound source localization), [biostatistics](#) (genomics, transcriptomics, proteomics), [computer vision](#) (image segmentation).

## Selected Publications

### Deep neural networks

- 2023 Truong Giang Do, Huy Khiem Le, Quang Pham, TrungTin Nguyen, Binh T. Nguyen, Thanh-Nam Doan, Chenghao Liu, Savitha Ramasamy, Xiaoli Li, and Steven HOI. [HyperRouter: Towards Efficient Training and Inference of Sparse Mixture of Experts](#). In *Empirical Methods in Natural Language Processing. EMNLP 2023 Main*, December 2023.

### Approximation capabilities and convergence rates of the mixture of experts models

- 2023 Huy Nguyen, TrungTin Nguyen, Khai Nguyen, and Nhat Ho. [Towards Convergence Rates for Parameter Estimation in Gaussian-gated Mixture of Experts](#). *arXiv preprint arXiv:2305.07572*, May 2023.
- 2023 Huy Nguyen, TrungTin Nguyen, and Nhat Ho. [Demystifying Softmax Gating Function in Gaussian Mixture of Experts](#). In *Thirty-seventh Conference on Neural Information Processing Systems. NeurIPS 2023 Spotlight*, 2023.
- 2023 Huy Nguyen, Pedram Akbarian, TrungTin Nguyen, and Nhat Ho. [A General Theory for Softmax Gating Multinomial Logistic Mixture of Experts](#). *arXiv preprint arXiv:2310.14188*, October 2023.
- 2022 TrungTin Nguyen, Faicel Chamroukhi, Hien D. Nguyen, and Geoffrey J. McLachlan. [Approximation of probability density functions via location-scale finite mixtures in Lebesgue spaces](#). *Communications in Statistics - Theory and Methods*, pages 1–12, May 2022.
- 2021 Hien Duy Nguyen, TrungTin Nguyen, Faicel Chamroukhi, and Geoffrey John McLachlan. [Approximations of conditional probability density functions in Lebesgue spaces via mixture of experts models](#). *Journal of Statistical Distributions and Applications*, volume 8, page 13, 2021.
- 2020 TrungTin Nguyen, Hien D Nguyen, Faicel Chamroukhi, and Geoffrey J McLachlan. [Approximation by finite mixtures of continuous density functions that vanish at infinity](#). *Cogent Mathematics & Statistics*, volume 7, page 1750861. Cogent OA, 2020.

### Model selection

- 2023 TrungTin Nguyen, Dung Ngoc Nguyen, Hien Duy Nguyen, and Faicel Chamroukhi. [A non-asymptotic risk bound for model selection in high-dimensional mixture of experts via joint rank and variable selection](#). In *Australasian Joint Conference on Artificial Intelligence 2023. AJCAI 2023 Long Oral Presentation*, Brisbane, Australia, November 2023.
- 2023 TrungTin Nguyen, Florence Forbes, Julyan Arbel, and Hien Duy Nguyen. [Bayesian nonparametric mixture of experts for high-dimensional inverse problems](#). *Preprint. hal-04015203*, March 2023.
- 2022 TrungTin Nguyen, Hien Duy Nguyen, Faicel Chamroukhi, and Florence Forbes. [A non-asymptotic approach for model selection via penalization in high-dimensional mixture of experts models](#). *Electronic Journal of Statistics*, volume 16, pages 4742 – 4822, 2022.
- 2021 TrungTin Nguyen. [Model Selection and Approximation in High-dimensional Mixtures of Experts Models: From Theory to Practice](#). Ph.D. Thesis, Normandie Université, December 2021.

### Simulation-based inference

- 2023 Hien Duy Nguyen, TrungTin Nguyen, Julyan Arbel, and Florence Forbes. [Concentration results for approximate Bayesian computation without identifiability](#). *Preprint. hal-03987197*, February 2023.

- 2022 Florence Forbes, Hien Duy Nguyen, TrungTin Nguyen, and Julyan Arbel. [Summary statistics and discrepancy measures for approximate Bayesian computation via surrogate posteriors](#). *Statistics and Computing*, volume 32, page 85, October 2022.

## Selected Conference, Seminar, Workshop Presentations

- 12/2022 [2022 IMS International Conference on Statistics and Data Science \(ICSDS\)](#), Italy (Oral presentation).  
10/2022 [BNP13 – 13th Conference on Bayesian Nonparametrics](#), Puerto Varas, Chile (Oral presentation).  
06/2022 [53èmes Journées de Statistique de la Société Française de Statistique](#), Lyon, France (Oral presentation).  
04/2021 [MiMo 2021: Workshop on Mixture Models](#), Université de Rouen Normandie, France (Invited speaker).

## Teaching Experiences

- 01-04/2023: [Statistical analysis and document mining \(Complementary Course, 16.5h\)](#). Responsible professor: [Pedro Rodrigues](#), *Master 1 of Applied Mathematics, Université Grenoble Alpes*, France.  
09-12/2022: [Méthodes statistiques pour la biologie - STA301 \(Travaux Dirigés, 23h\)](#). Responsible professor: [Julien Chevallier](#), *Licence Sciences et Technologies - BIO, Université Grenoble Alpes*, France.  
Fall 2018: [Mathematical and numerical foundations of modeling and simulation using partial differential equations \(Teaching Assistant, 24h\)](#). Responsible professor: [Jing-Rebecca Li \(IDEFIX team, Inria\)](#), *French-Vietnam Master 2 in Applied Mathematics, VNU-HCM*, Vietnam.  
Fall 2017: [Principles of Mathematical Analysis \(Teaching Assistant, 30h\)](#). Responsible professor: [Duong Minh Duc](#), *Bachelor in Mathematics and Computer Science, VNU-HCM*, Vietnam.

## Fellowships and Awards

- 10/2022 [BNP13 Junior Travel Award](#) (1000 USD) granted by [International Society for Bayesian Analysis](#).  
2022-2025 [Qualifications aux fonctions de Maître de Conférences](#). Section 26. [Mathématiques appliquées et applications des mathématiques](#). **Designated rapporteurs:** [Fabienne Comte](#), and [Fanny Villers](#).  
2022–2023 Postdoctoral Fellowships granted by [Inria centre at the University Grenoble Alpes](#), France.  
2018–2021 Ph.D. Scholarship granted by [Ministère de l'Enseignement Supérieur et de la Recherche](#), France.  
2017 Highest Distinction Graduation Award and Outstanding Student Award, [VNU-HCM](#), Vietnam.  
2014–2017 Scholarship of the National Program for the Development of Mathematics 2010–2020 of [Vietnam Institute for Advanced Study in Mathematics \(VIASM\)](#), Vietnam.

## Collaborators (in random order)

1. [Geoff McLachlan](#): Professor of Statistics (Personal Chair), [School of Mathematics and Physics, University Of Queensland](#), Brisbane, Australia.
2. [Florence Forbes](#): Senior Researcher (Director of Research), [Statify Team](#), [Inria centre at the University Grenoble Alpes](#), Grenoble, France.
3. [Faïcel Chamroukhi](#): Full Professor of Statistics and Data Science, [Université de Caen Normandie](#), [Lab. of Mathematics Nicolas Oresme \(LMNO\)](#), [UMR CNRS 6139](#); Scientific head of Data Science and Artificial Intelligence, [IRT SystemX](#), the Research & Technology Organisation of [Université Paris-Saclay](#), Palaiseau, France.
4. [Hien Duy Nguyen](#): Associate Professor, [School of Computing, Engineering and Mathematical Sciences](#), [La Trobe University](#), Bundoora, Victoria, Australia.
5. [Nhat Ho](#): Assistant Professor, [Department of Statistics and Data Sciences](#), [The University of Texas at Austin](#), Austin, Texas, United States.
6. [Julyan Arbel](#): Associate Researcher (Chargé de Recherche), [Statify Team](#), [Inria centre at the University Grenoble Alpes](#); [Laboratoire Jean Kuntzmann](#), member of [Université Grenoble Alpes Grenoble](#), Grenoble, France.
7. [Binh Nguyen](#): Associate Professor of Computer Science and the Head of the Department of Computer Science, [Faculty of Mathematics and Computer Science](#), [University of Science \(VNUHCM-US\)](#), [Vietnam National University \(VNUHCM\)](#), Ho Chi Minh City, Vietnam.

8. **Quang Pham**: Research Scientist, [Machine Intellection department](#), [Institute for Infocomm Research \(I2R\)](#), [A\\*Star](#), Singapore.
9. **Huy Nguyen**: Phd Student, [Department of Statistics and Data Sciences](#), [The University of Texas at Austin](#), Austin, Texas, United States.
10. **Khai Nguyen**: Phd Student, [Department of Statistics and Data Sciences](#), [The University of Texas at Austin](#), Austin, Texas, United States.
11. **Dung Ngoc Nguyen**: Postdoctoral Research Fellow in Statistics, [Department of Statistical Sciences](#), [University of Padova](#), Padova, Italy.
12. **Ho Minh Duy Nguyen**: PhD Candidate, [Max Planck Research School for Intelligent Systems & DFKI](#), Stuttgart, Germany.
13. **Giang Truong Do**: Research Assistant, [University of Tennessee](#), Tennessee, United States.
14. **Le Huy Khien**: Research Assistant, [Vin University](#), Hanoi, Vietnam.

## Professional Services

### Journal Reviewing

[Journal of the American Statistical Association](#) (Taylor Francis): 1 paper. See certificate.

[Australian & New Zealand Journal of Statistics](#) (Wiley): 2 paper. See certificate.

[Computational Statistics and Data Analysis](#) (Elsevier): 4 papers. See certificate.

[Neurocomputing](#) (Elsevier): 1 paper. See certificate.

[Biometrical Journal](#) (Wiley): 2 papers. See certificate.

[Communications in Statistics - Theory and Methods](#) (Taylor Francis): 2 papers. See certificate.

### Conference Reviewing/Program Committee

[Proceedings of the Research School on Statistics and Data Science \(RSSDS 2019\)](#) (Springer): 2 papers

### Editorial Board

[International Journal of Machine Intelligence and Sensory Signal Processing](#) (Inderscience): Associate Editors

## Referees

### **Hien Duy Nguyen**

*Associate Professor*

[School of Computing, Engineering and Mathematical Sciences](#)

[La Trobe University](#), Australia

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### **Geoffrey McLachlan**

*Professor of Statistics*

[School of Mathematics and Physics](#)

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### **Florence Forbes**

*Senior Researcher*

[Head of the Statify team](#)

[Inria centre at the University Grenoble Alpes](#), France

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### **Nhat Ho**

*Assistant Professor*

[Department of Statistics and Data Sciences](#)

[The University of Texas at Austin](#), United States

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### **Faïcel Chamroukhi**

*Professor of Statistics and Data Science*

[Head of Data Science and Artificial Intelligence](#)

[IRT SystemX](#), France

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### **Julyan Arbel**

*Associate Researcher*

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