

# Trung Tin Nguyen

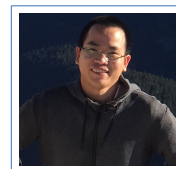
## Curriculum Vitae (Short)

Postdoc at Statify Team - Inria

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🏠 [Homepage: trung-tinnguyen.github.io](https://trung-tinnguyen.github.io)

📄 [Long CV Version](#), September 21, 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, The University Of Queensland*, Queensland, France.  
**Topic:** Stochastic majorization–minimization algorithms for data science.  
**Mentors:** [Xin Guo](#), [Hien Duy Nguyen](#), and [Florence Forbes](#).
- 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](#), [Hien Duy Nguyen](#), 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).
- 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).

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## Selected Publications

### Model selection

- 2023 TrungTin Nguyen, Dung Ngoc Nguyen, Hien Duy Nguyen, and Faicel Chamroukhi. [A non-asymptotic theory for model selection in high-dimensional mixture of experts via joint rank and variable selection](#). In *Australasian Joint Conference on Artificial Intelligence 2023*, 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.

### 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*, 2023.
- 2023 Huy Nguyen, TrungTin Nguyen, and Nhat Ho. [Demystifying Softmax Gating in Gaussian Mixture of Experts](#). *arXiv preprint arXiv:2305.03288*, Accepted at *NeurIPS 2023 as a spotlight*, 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.

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## 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).

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## 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.

## Professional Services

### Journal Reviewing

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

*Australian & New Zealand Journal of Statistics (Wiley)*: 1 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

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## Referees

### **Florence Forbes**

*Senior Researcher*

Head of the Statify team

Inria centre at the University Grenoble Alpes, France

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### **Hien Duy Nguyen**

*Senior Lecturer*

*School of Mathematics and Physics*

University of Queensland, Australia

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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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### **Geoffrey McLachlan**

*Professor of Statistics*

*School of Mathematics and Physics*

University of Queensland, Australia

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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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### **Julyan Arbel**

*Associate Researcher*

Associate Researcher of the Statify team

Inria centre at the University Grenoble Alpes, France

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