# YVES ATCHADÉ

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## EDUCATION

**Université Nationale du Bénin** — **Abomey-Calavi**
*DEUG (Math.-Phys.), Benin* — *1992–1995*

**École Nationale de Statistique et d'Économie Appliquée** — **Abidjan**
*Diplome d'Ingénieur, Cote d'Ivoire* — *1995–1998*

**University of Montreal** — **Montreal**
*PhD, Canada* — *2000–2003*

**Harvard University** — **Cambridge**
*Postdoc, USA* — *2003–2004*

## APPOINTMENTS

1. **Boston University, Department of Mathematics and Statistics, Boston, USA**.
   2018-present, Professor of Statistics.
   2020-present, Founding member, Faculty of Computing and Data Sciences.
   2020-present, Associate faculty, Department of Statistics, Harvard University.
2. **University of Michigan, Department of Statistics, Ann Arbor, USA**.
   2012-2018, Associate Professor.
   2006-2012 Assistant Professor.
3. **University of Ottawa, Department of Mathematics and Statistics, Ottawa, Canada**.
   2004 to 2006: Assistant Professor of Statistics.

## RESEARCH INTERESTS

Computational statistics, high-dimensional Bayesian inference, state space models, statistical methods in remote sensing.

## AWARDS AND HONORS

- Elected Fellow, Institute of Mathematical Statistics (IMS), 2020.
- Prix Carl-Herz 2003, Université de Montreal.
- NSERC (Canada) Postdoctoral Fellowship (2003-2004).

○ NSERC (Canada) Postgraduate Fellowship (2002-2003).

# STUDENTS

## PHD Students

**Xinru Liu**: (phd candidate). Thesis:"Topics in deep reinforcement learning".

**Yi Sun**: (phd candidate). Thesis:"Deep learning models for remote sensing".

**Qiuyun Zhu**: (phd candidate). Thesis:"On Bayesian GANs".

**Liwei Wang**: (phd candidate). Thesis:"Topics in sparse Bayesian machine learning".

**Keer Jiang**: (phd candidate). Thesis:"Topics in sparse Bayesian machine learning".

**Anwesha Battacharyya**: (graduated May 2020). Thesis: "Topics in high-dimensional Bayesian inference and computation".

**Jun Guo**: (graduated May 2018). Thesis: "Some Contributions to High Dimensional Mixed-effects Logistic Regression Models".

**Chia Chye Yee**: (graduated Aug. 2016) Thesis: "Some contributions to sparse Bayesian estimation with application to hyperspectral imaging".

**Sandipan Roy**: (graduated April 2015). Jointly with George Michailidis. Thesis: "Dynamic high-dimensional network estimation".

**Jing Wang**: (graduated April 2011). Thesis: "Approximate Sampling for Doubly-Intractable Distributions and Modeling Choice Interdependence in a Social Network". Jointly with Anocha Aribarg, Ross Business School.

**Yang Yang**: (graduated April 2011). Thesis: "Contributions to the Analysis of Multistate and Degradation Data". Jointly with Vijay Nair.

## Postdoc fellows

**Joonha Park**: (2018-2020). Now at the University of Kansas, Lawrence.

**Gautam Sabnis**: (2017-2019) Now at Jackson Laboratories, Bar Harbor.

## Masters and honor undergraduate students

**Andrew Furlong**: (undergrad student from CMU), summer 2019. "Exploring the Safecast dataset".

**Ao Wang**: (undergrad), fall 2017. "Statistical modeling of particulate matters measurements".

**Tianyou Luo**: (undergrad student from Pekin University), Summer 2017. "Space-time filtering".

**Jingxue Xu**: (undergrad), fall 2016. "Exploring MODIS Africa data".

**Joseph Leland Bybee**: (master), summer and Fall 2016. "Computational aspects of high-dimensional change point models".

**Miao Wang**: (undergrad), Winter 2016. "Some numerical experiments with response driven sampling methods".

**Yusheng Jiang**: (undergrad), Summer 2016. "Proximal gradient algorithms for g-lasso".

**Weiqing Yu**: (master), summer 2015. "A C++ implementation of the Moreau-Yosida approximation".

**Avery Wu**: (undergrad), Summer 2014. "Estimation of soil carbon stocks in African countries".

## FUNDING

**NSF-DMS 2015485**: (PI Atchadé, 2020-2023). "Advancing high-dimensional Bayesian asymptotics and computation". Funded amount: $160,000.

**NSF-DMS 1513040**: (PI Atchadé, 2015-2019). "High-dimensional Bayesian computations: the Moreau-Yosida approximation". Funded amount: $358,449.

**University of Michigan LSA APSF**: (PI, Atchade 2015-2017), "High-dimensional Bayesian computations: the Moreau-Yosida approximation". Funded amount: $93,973.

**NSF-DMS 130891**: Grant (PI Ionides, Co-PI Atchadé, 2013-2016). "Iterated filtering: New theory, algorithms and applications". Funded amount: $100,000.

**NSF-SES 1229261**: (PI Schilling, Co-PI Atchadé, 2012-2015). "Faster Mixing Markov Chain Monte Carlo for Multidimensional IRT and Cognitive Diagnosis Models". Funded amount: $196,000.

**NSF-DMS 1228164**: (PI Michailidis, Co-PI Atchadé, 2012-2015). "Statistical modeling and computations for data with network structure". Funded amount: $450,000.

**NSF-DMS 0906631**: (PI Atchadé, 2009-2012) "Adaptive Markov Chain Monte Carlo methods". Funded amount: $99,556.

**University of Michigan Rackham Grant**: (PI Atchadé, 2007-2008). "Phylogenetic inference using models of sequence evolution that incorporates proteins tertiary structure". Funded amount: $15,000.

**NSERC (CANADA)**: (PI Atchadé, 2004-2006). Adaptive Markov Chain Monte Carlo: Methodology, Theory and Applications.

## PUBLICATIONS

### TECHNICAL REPORTS

1. Y. Atchadé and L. Wang (2020). *A fast asynchronous MCMC sampler for sparse Bayesian inference.* Submitted to JRSS-B.
2. A. Bhattacharyya and Y. Atchadé (2019) *Bayesian Analysis of High-dimensional Discrete Graphical Models*, (arXiv:1907.01170).

3. Y. Atchadé, G. Sabnis and P. Dovonon, (2019). *Bayesian variable selection in linear regression models with instrumental variables*. (arXiv:1901.03182).
4. Y. Atchadé, A. Bhattacharyya (2019). *An approach to large-scale quasi-Bayesian inference with spike-and-slab priors*, (arXiv:1803.10282).

## PEER-REVIEWED PUBLICATIONS

1. Y. Atchadé (2021). *Approximate spectral Gaps for Markov chains mixing times in high dimensions*. (SIAM Journal on Mathematics of Data Science 3, 854-872; arXiv:1903.11745).
2. Joonha Park and Y. Atchadé (2020). *Markov chain Monte Carlo algorithms with sequential proposals*. Statistics and Computing 30, 1325–1345. (arXiv:1907.06544).
3. D. Nguyen, P. de Valpine, Y. Atchadé, D. Turek, N. Michaud, C. Paciorek (2020). *Nested adaptation of MCMC algorithms*, Bayesian Analysis 15 (4) 1323 - 1343.
4. Y. Atchadé and P. Dovonon (2020). *Efficiency bounds for semiparametric models with singular score functions* Econometric Review 39, 612-648.
5. P. Jacob, J. O'Leary, and Y. Atchadé (2020). *Unbiased Markov chain Monte Carlo with couplings*, JRSS-B 82: 543-600. with discussion.
6. H. Keshavarz, G. Michailidis, and Y. Atchadé (2020). *Sequential change-point detection in high-dimensional Gaussian graphical models*, JMLR 21 (82), 1-57.
7. S. Roy, Y. Atchadé, and G. Michailidis (2019). *Likelihood Inference for Large Scale Stochastic Blockmodels with Covariates based on a Divide-and-Conquer Parallelizable Algorithm with Communication*. JCGS 3, vol 28.
8. Y. Atchadé (2019). *Quasi-Bayesian estimation of large Gaussian graphical models*. Journal of Multivariate Analysis 173, 656-671.
9. G. Fort, L. Risser, Y. Atchadé, and E. Moulines (2018), *Stochastic Fista Algorithms: So Fast ?* Proceedings of the 2018 IEEE Statistical Signal Processing Workshop (SSP), 796-800.
10. L. Bybee and Y. Atchadé (2018) *Change-point computation for large graphical models: a scalable algorithm for Gaussian graphical models with change-points*. JMLR 19, 440-477.
11. Y. Atchadé (2017) *On the contraction properties of some high-dimensional quasi-posterior distributions*. Annals of Statistics 45, 2248-2273.
12. S. Roy, Y. Atchadé, and G. Michailidis (2017). Change-point estimation in high-dimensional Markov random field models. JRSS-B 79, 1187-1206.
13. Chia Chye Yee and Y. Atchadé (2017). *On the sparse Bayesian learning of linear models*. Communications in Statistics – Theory and Methods 46, 7672-7691.
14. Y. Atchadé and G. Fort, and E. Moulines (2017). *On stochastic proximal gradient algorithms*. JMLR 18(10), 1-33.
15. Y. Atchadé (2016). *Markov Chain Monte Carlo Confidence Intervals*. Bernoulli Vol. 22, No3, 1808-1838.
16. A.-M. Lyne, M. Girolami, Y. Atchadé, H. Strathmann, and D. Simpson (2015). *On Russian Roulette Estimates for Bayesian inference with doubly-intractable Likelihoods*. Statistical Science Vol. 30, No. 4, 443-467.

17. Y. Atchadé and Yizao Wang (2015). *On the Convergence Rates of Some Adaptive Markov Chain Monte Carlo Algorithms*. Journal of Applied Probability 2015, Vol. 30, No. 4, 443-467.
18. E. L. Ionides, D. Nguyen, Y. Atchadé, S. Stove, and A. King (2015). *Inference for dynamic and latent variable models via iterated, perturbed Bayes maps*. Proceedings of the National Academy of Science 112 (3) 719-724.
19. Y. Atchadé (2014). *Estimation of network structures from partially observed Markov random fields*. Electronic Journal of Statistics, Vol. 8, N. 2, 2242–2263.
20. Y. Atchadé and M. D. Cattaneo (2014). *A martingale decomposition for quadratic forms of Markov chains (with applications)*. Stochastic Processes and their Applications, Vol. 124, Issue 1, Pages 646-677.
21. Y. Atchadé and G. Michailidis (2014). *Discussion of the paper "A Brief Survey of Modern Optimization for Statisticians"*. International Statistical Review (2014), 82, 1, 71-75.
22. J. Wang and Y. Atchadé (2014). *Bayesian inference of exponential random graph models for large social networks*. Communications in Statistics - Simulation and Computation, Vol. 43, Issue 2, 359-377.
23. J. Wang, A. Aribarg and Y. Atchadé (2013). *Modeling choice interdependence in a social network*. Marketing Sciences, Volume 32 Issue 6, November-December 2013, pp. 977-997.
24. Y. Atchadé, N. Lartillot and C. P. Robert (2013). *Bayesian computation for statistical models with intractable normalizing constants*. Brazilian Journal of Probability and Statistics. Vol. 27, Number 4 (2013), 416-436.
25. Y. Atchadé and G. Fort (2012). Limit theorems for some classes of adaptive MCMC algorithms with sub-geometric kernels: Part II. Bernoulli, Vol. 18, 975-1001.
26. E. L. Ionides, A. Bhadra, Y. Atchadé and A. King (2011). *Iterated Filtering*. Annals of Statistics Vol. 39, 1776-1802.
27. Y. Atchadé, G. Fort, E. Moulines and P. Priouret (2011). *Adaptive Markov Chain Monte Carlo: Theory and Methods*. Book Chapter in "Bayesian Time Series Models", Cambridge University Press, page 32-51.
28. Y. Atchadé, J. S. Rosenthal and G. O. Roberts (2011). *Towards optimal Scaling of Metropolis-Coupled Markov Chain Monte Carlo*. Statistics and Computing Vol. 21, No 4, 555-568.
29. Y. Atchadé (2011). *A computational framework for empirical Bayes inference*. Statistics and Computing Vol. 21, No 4, 463-473.
30. Y. Atchadé (2011). *Kernel estimators of asymptotic variance for adaptive Markov Chain Monte Carlo*. Annals of Statistics Vol. 39, No 2, 990-1011.
31. Y. Atchadé (2010). *A cautionary tale on the efficiency of some adaptive Monte Carlo schemes*. Annals of Applied Probability Vol. 20, No. 3, 841-868.
32. Y. Atchadé and G. Fort (2010). *Limit theorems for some classes of adaptive MCMC algorithms with sub-geometric kernels*. Bernoulli Vol. 16, 116-154
33. Y. Atchadé and J. S. Liu (2010). *The Wang-Landau algorithm for Monte Carlo computation in general state spaces*. Statistica Sinica Vol. 20, 209-233.
34. Y. Atchadé (2009). *Resampling from the past to improve on MCMC samplers*. Far East

Journal of Theor. Statist. Vol. 27, Issue 1, 81-99.

35. C. Andrieu and Y. Atchadé (2007). *On the efficiency of some adaptive MCMC algorithms*. Elect. Comm. In Probab. Vol. 12, 336-349.
36. Y. Atchadé and F. Perron (2007). *On the Geometric Ergodicity of the Metropolis-Hastings Algorithm*. Statistics Vol. 41, 77-84.
37. Y. Atchadé and J. S. Liu (2006). *Discussion of the "Equi-Energy sampler"*. Annals of Statistics Vol. 34, No. 4, 1620-1628.
38. Y. Atchadé (2006). *An adaptive version for the Metropolis adjusted Langevin algorithm with a truncated drift*. Methodol. and Comput. in Applied Probab. Vol. 8, 235-254.
39. Y. Atchadé and J. S. Rosenthal (2005). *On Adaptive Markov Chain Monte Carlo Algorithms*. Bernoulli Vol. 11, 815-828.
40. Y. Atchadé and F. Perron (2005). *Improving on the Independent Metropolis-Hastings Algorithm*. Statistica Sinica Vol. 15, 3-18.

## EDITORIAL AND PROFESSIONAL SERVICE

**Associate Editor:** Bernoulli, (2022-2025).

**Associate Editor:** Harvard Data Science Review (HDSR), (2020-2023).

**IMS committees:** 2021-2022 IMS Fellow Committee; 2021-2022 IMS Committee on Nominations (ex-officio); 2020-2021 IMS Committee on Nominations (chair); 2019-2020 IMS Committee on Nominations; 2018-19 IMS Committee for IMS Monographs and Textbooks Editor.

**ISBA committee:** member of 2021 ISBA Blackwell-Rosenbluth Award committee.

**Harriri Institute DEI Committee:** Chaired the 2021 Diversity, Equity and Inclusion Committee at the BU Hariri Institute for Computing.

**NSF review panel:** NSF Review Panels (2013, 2016, 2019).

**NextProf Science committee:** Workshop for fostering diversity in science. The University of Michigan (2016, 2017, 2018).

**External reviewer for probability and statistics journals (recent):** Annals of Applied Probability, Annals of Statistics, Bernoulli, Electronic Journal of Statistics, JASA, Journal of financial Econometrics, JRSS-B, JCGS, MCAP, Statistica Sinica, Statistics and Computing.

**Summer seminar series:** Université Paris-Est, Paris, France (Jun. 2010). On Adaptive Markov Chain Monte Carlo.

**Summer mini-course:** At the *Institut de Recherche en Economie Empirique et Politique* (IREEP, www.ireep.org), Cotonou, Benin. Course title: "Methodes Computationelles en Statistique". Summer 2004, 2005, 2006, Spring 2007, 2008.

# RECENT INVITED TALKS

- Invited department colloquium speaker: **University of Chicago**, Mar. 2021; **University of Kansas Laurence**, Dec. 2020; **University of Pennsylvania**, Nov. 2020; **Harvard University**, Sept. 2020; **Purdue University**, Nov. 2019; **UMass Amherst** Oct. 2019; **Stanford University** May 2019; **ENSEA-Abidjan** (Nov. 2018); **Georgia Tech** (Mar. 2018), **University of Toronto** (Mar. 2017), **Boston University** (Mar. 2017),**University of Wisconsin** (Feb. 2017), **University of Florida** (Nov. 2016), **Harvard University** (Nov. 2016), **University of Minnesota** (Oct. 2016), **Ohio State University** (Nov. 2015), **Rice University** (Sept. 2014), NeuroStat Seminar **Columbia University** (Oct. 2013), BigMC Seminar series **IHP Paris** France (Mar. 2013), Probability seminar **Cornell University** (Jan. 2013), **CIREQ Concordia University, Montreal** (May 2012), **University of Illinois Urbana-Champaign** (Aug. 2011), **Colorado State University** (March 2011), **University of Florida** (March 2011), Big MC Seminar Series **IHP Paris** (Jun. 2010), **University of Iowa** (Oct. 2009), **University of Montreal** (Apr. 2008), **University of British Columbia** (Oct. 2006), **UC Davis** (March 2006).

- Invited conference speaker: **JSM 2022** Virtual, Aug. 2021; **MCQMC 2020** Virtual, Aug. 2020, Plenary speaker; **2018 Symposium on Statistics and Data Science** May 2018, Reston, VA; **2017 SAMSI Workshop On Monte Carlo Methods** Duke University Dec. 2017; **5th Workshop on Cognition and Control** University of Florida, Jan. 2017, **New challenges for New Data in Economics and Finance**, University of Toronto, Toronto, Nov. 2016, **Estimating normalizing constants**, University of Warwick, Coventry, UK, April 2016, **MCQMC 2014**, Leuven, Belgium, April 2014, **MCQMC 2012**, Sydney, Australia, Feb. 2012., **ISBA 2012**, Kyoto, Japan, July 2012., Information Theory and Applications (**ITA 2011**), UC San Diego; **AdapSki 2011** ParkCity, Utah; textbfMarkov chain Monte Carlo and related methods 2009, Warwick, UK; **Optimisation of MCMC Algorithms 2009**, Warwick, UK; **JSM 2008**, Denver, Colorado; **ISBA 2008**, Hamilton Island, Australia; **Bayesian Inference for High-Dimensional data 2008**, Warwick, UK; **Adapski 2008**, Bormio Italy; **Third Workshop on Monte Carlo methods 2007**, Harvard University; **JSM 2007**, Salt Lake City; **JSM 2006**, Seattle.