Belhal **Karimi**

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Education

Ecole Polytechnique, CMAP — *Paris, FR*

PH.D. IN MACHINE LEARNING — *Oct. 2016 - Oct. 2019*

- Nonconvex Optimization for Machine Learning: Algorithms, Analysis and Applications
- Member of the XPOP team (INRIA) focussing on statistics for life sciences
- Under the supervision of Marc Lavielle and Eric Moulines

Mines Paritech, PSL ITI — *Paris, FR*

MASTER OF SCIENCE — *Sept. 2015 - June 2016*

- Main topics: Machine Learning, Computer vision, Optimization, Cognitive sciences

CentraleSupelec — *Paris, FR*

BACHELOR AND MASTER OF SCIENCE — *Sept. 2011 - June 2015*

- Semester at ESCP Europe: Master in Management. London Campus
- 3rd year at Telecom ParisTech, Master IREN: Economics and Innovation

Skills

Programming Languages Python (TF, Torch, Keras, Scikit-Learn), R (tidyverse, saemix), Stan, Matlab, SQL, LaTeX, Django, Javascript, CSS

French: native, English: fluent, Spanish: advanced, Persian: native

Experience

Baidu Research — *Beijing, CN*

ML RESEARCHER — *Feb. 2020 - Present*

- Cognitive Computing Lab led by Dr. Ping Li
- Machine Learning, Nonconvex Optimization, Probabilistic Deep Learning

Monk AI — *Paris, FR*

SCIENTIFIC ADVISOR — *Sept. 2019 - Present*

- AI based inspection system
- Working with the Research Team on car damages detection using deep learning models

Samsung AI — *Moscow, RU*

VISITING SCHOLAR — *Jul. 2019 - Sept. 2019*

- Bayesian Deep Learning: optimization and design
- Working with Dr. Dmitry Vetrov at the Samsung AI - HSE Lab (ANR-11-LABX-0056-LMH, LabEx LMH)

Freelance Contractor — *Paris, FR*

DEEP LEARNING CONSULTANT — *Sept. 2017 - Sept. 2019*

- Popsy (classifieds): Category and Price prediction based on listing images (using a multi-output multi-class VGGNet)
- OuiCar (P2P car sharing): Damages detection on car pictures (using a Mask R-CNN)

INRIA — *Palaiseau, FR*

PH.D. CANDIDATE — *Oct. 2016 - Oct. 2019*

- Member of the XPOP team, INRIA & CMAP, focussing on Machine Learning for life sciences
- Nonconvex Optimization Methods for PK-PD modeling

Massachusetts Institute of Technology, MIT — *Boston, USA*

VISITING SCHOLAR — *Jan. 2016 - Jul. 2016*

- Machine Learning research, Brain and Cognitive Sciences department, ProbComp Lab. Working on MCMC methods and diagnostic tools. Collaboration with the Gates Foundation. Under the supervision of Vikash Mansinghka.

Avolta Partners — *Paris, FR*

M&A ANALYST — *Mar. 2015 - Sep. 2015*

- Writing of Information Memorandum and Business Plan for high-tech startups (A and B series)
- Analysis on fundraising data in France (Time-to-next series, average first series amount, etc.)

Rocket Internet *Paris, FR*

Global venture developer *Feb. 2014 - Aug. 2014*

- Launching Lamudi/Carmudi in 20+ African countries
- Expansion team, helping Business Intelligence team with performance reports

eKomi - the Feedback Company *Berlin, DE*

Business Intelligence *Jul. 2013 - Feb. 2014*

- Business Intelligence (metrics by country, season, segment)
- Improvement of internal processes (Sales planning, Workflow, Business and Market Intelligence)

Curioos *Paris/New York*

Data analyst *Jun. 2012 - Aug. 2012*

- Data Intelligence team. Working on persona definition for new products.

Research Articles

HWA: Hyperparameters Weight Averaging in Bayesian Neural Networks

Belhal Karimi and Ping Li

- To be submitted to AABI21, 3rd Symposium on Advances in Approximate Bayesian Inference.

VFG: Variational Flow Graph Model With Hierarchical Latent Data Structures

Shaogang Ren, Yang Zhao, **Belhal Karimi** and Ping Li

- Submitted to AISTATS 2021, 24th International Conference on Artificial Intelligence and Statistics.

OPT-AMSGrad: An Optimistic Acceleration of AMSGrad for Nonconvex Optimization

Jun-Kun Wang, Xiaoyun Li, **Belhal Karimi** and Ping Li

- Submitted to AISTATS 2021, 24th International Conference on Artificial Intelligence and Statistics.

FedSKETCH: Communication-Efficient and Private Federated Learning

Farzin Haddadpour, **Belhal Karimi**, Ping Li and Xiaoyun Li

- Submitted to AISTATS 2021, 24th International Conference on Artificial Intelligence and Statistics.

Convergent Adaptive Gradient Methods in Decentralized Optimization

Xiangyi Chen, **Belhal Karimi**, Weijie Zhao and Ping Li

- Submitted to ICLR 2021, 9th International Conference on Learning Representations.

MISSO: Minimization by Incremental Stochastic Surrogate for large-scale nonconvex Optimization

Belhal Karimi, Hoi-To Wai, Eric Moulines and Ping Li

- Submitted to ICLR 2021, 9th International Conference on Learning Representations.

Two-Time-Scale Stochastic EM Algorithms

Belhal Karimi and Ping Li

- Submitted to ALT 2021, 32nd International Conference on Algorithmic Learning Theory.

Towards Better Generalization of Adaptive Gradient Methods

Yingxue Zhou, **Belhal Karimi**, Jinxing Yu, Zhiqiang Xu and Ping Li

- Advances in Neural Information Processing Systems (NeurIPS 2020), Vancouver, CA.

A fast Stochastic Approximation of the EM for nonlinear mixed effects models

Belhal Karimi, Marc Lavielle and Eric Moulines

- Computational Statistics and Data Analysis (CSDA), Volume 141, January 2020, p. 123-138.

On the Global Convergence of Fast Incremental EM Methods

Belhal Karimi, Hoi-To Wai, Marc Lavielle and Eric Moulines

- Advances in Neural Information Processing Systems (NeurIPS 2019), 2833-2843, Vancouver, CA.

Non-asymptotic Analysis of Biased Stochastic Approximation Scheme

Belhal Karimi, Hoi-To Wai, B. Miasojedow and Eric Moulines

- Conference On Learning Theory (COLT 2019), Phoenix, USA.

On the Convergence Properties of the Mini-Batch EM and MCEM Algorithms

Belhal Karimi, Marc Lavielle and Eric Moulines

- HAL preprint hal: 02334485, 2019.

A Doubly Stochastic Surrogate Optimization Scheme for Non-convex Problems

Belhal Karimi and Eric Moulines

- Bayesian Deep Learning Workshop (NeurIPS 2018), Montreal, CA.

Efficient Metropolis-Hastings sampling for nonlinear mixed effects models

Belhal Karimi and Marc Lavielle

- International Conference on Bayesian Statistics in Action (BAYSM 2018), p. 85-93, Warwick, UK.

Non linear Mixed Effects Models: Bridging the gap between Independent Metropolis Hastings and Variational Inference

Belhal Karimi, Marc Lavielle and Eric Moulines

- Implicit Models Workshop (ICML 2017), Sydney, AU.

Talks and Posters

Nonconvex Optimization for Latent Data Models

Baidu Research (Beijing, Seattle, Sunnyvale)

Fast Incremental EM Methods

NeurIPS 2019 (Vancouver, Canada)

An Incremental and An Online Point of View of Nonconvex Optimization

Samsung AI Center (Moscow, Russia)

MISSO Scheme

NeurIPS 2018: Bayesian Deep Learning Workshop (Montreal, Canada)

Some Accelerations of MLE Algorithms

COMPSTATS 2018 (Iasi, Romania)

Inference in mixed effects models

Facebook HQ (Paris, France)

HBGDki studies with BayesDB (Poster)

McGovern Institute (Boston, USA)

Software

Saemix: Open Source R Package for Nonlinear Mixed Effects Models

Main Contributor

- Project Website `saemixr.github.io`
- Developing features and extensions in R code `github.com/saemixdevelopment`
- Project R Bookdown `saemixdevelopment.github.io`
- Ongoing Chan Zuckerberg Initiative funding application.

Awards

2019	**Jacques Hadamard Researcher Grant**, Samsung AI - HSE Lab, ANR-11-LABX-0056-LMH	*Moscow, RU*
2019	**Student travel award**, COLT Conference	*Phoenix, USA*
2018	**Young researcher travel award**, BAYSM Conference	*Warwick, UK*
2017	**Jacob Startup Competition**, Agora Pitch, 4th place	*Bremen, DE*

Teaching Activities

2017-2018	**MAP534: Machine Learning**, Msc Ecole Polytechnique-HEC	*Palaiseau, FR*
2017-2018	**MAP535: Regression**, Msc Ecole Polytechnique-HEC	*Palaiseau, FR*
2017-2018	**Bayesian Statistics**, Msc Data Science Ecole Polytechnique	*Paris, FR*
2018-2019	**Innovation & Technology**, 3A Ecole Polytechnique	*Palaiseau, FR*

Reviewing Activities

2020 **Neural Information Processing Systems Foundation**, ICBINB Workshop
2019 **International Conference on Artificial Intelligence and Statistics**, AISTATS
2019 **Symposium on Advances in Approximate Bayesian Inference**, AABI
2019 **International Conference on Machine Learning**, ICML
2019 **Statistics and Computing**, Journal - Springer
2019 **Neural Networks**, Journal - Elsevier

Extracurricular Activities

Entrepreneurship Agora: Detecting flaws at scale on images. `http://get-agora.com/`
Sports Basket-ball, Surf, Skateboard, Soccer
Fun Fashion (needlepoint), Music production (Maschine), Reading (Sociology)

References

Eric Moulines *eric.moulines@polytechnique.edu*
Professor at Ecole Polytechnique, Academie des Sciences

Marc Lavielle *marc.lavielle@inria.fr*
Research Director at INRIA and Professor at Ecole Polytechnique

Ping Li *pingli98@gmail.com*
Deputy Dean of Baidu Research Institute, Head of Cognitive Computing Laboratory

Jean-Michel Dalle *jean-michel.dalle@upmc.fr*
Director of Agoranov, Professor at Sorbonne Univeriste