

# Belhal Karimi

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## Education

### Ecole Polytechnique, CMAP

PHD IN MACHINE LEARNING

Paris, France

Oct. 2016 - Oct. 2019

- Nonconvex Optimization for Machine Learning: Algorithms, Analysis and Applications
- Under the supervision of Marc Lavielle and Eric Moulines

### Mines Paritech, PSL

MASTER OF SCIENCE

Paris, FR

Sept. 2015 - June 2016

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

### CentraleSupélec, Supélec track

ENG. DEGREE

Paris, France

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, Keras, Scikit-Learn), R (Package saemix), Stan, Matlab, SQL, LaTeX, Django, Javascript, HTML5, CSS

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

## Experience

### Samsung AI

VISITING SCHOLAR

Moscow, RU

Jul. 2019 - Sept. 2019

- Bayesian Deep Learning: optimization and design
- Working with Dr. Dmitry Vetrov at the Samsung AI - HSE Lab

### Freelance consultant

DEEP LEARNING CONSULTANT

Paris, FR

Sept. 2017 - Present

- 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)

### Bill & Melinda Gates Foundation

DATA SCIENTIST

Boston, USA

Feb. 2016 - Apr. 2016

- Applying Bayesian Statistics to enable domain experts that lack statistical expertise to perform qualitative model checking and encode simple forms of qualitative prior knowledge
- Automation of "data sketches" that can quickly identify common-sense relationships between variables

### Massachusetts Institute of Technology, MIT

VISITING SCHOLAR

Boston, USA

Jan. 2016 - Jul. 2016

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

### Avolta Partners

M&A ANALYST

Paris, FR

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

GLOBAL VENTURE DEVELOPER

Paris, FR

Feb. 2014 - Aug. 2014

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

### eKomi - the Feedback Company

BUSINESS INTELLIGENCE

Berlin, DE

Jul. 2013 - Feb. 2014

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

## Extracurricular Activity

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

## Research Articles

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### On the Global Convergence of Fast Incremental EM Methods

B. KARIMI, HOI-TO WAI, MARC LAVIELLE AND E. MOULINES

- Accepted at NeurIPS 2019

### A Doubly Stochastic Surrogate Optimization Scheme for Non-convex problems

B. KARIMI, HOI-TO WAI AND E. MOULINES

- Work in Progress

### Non-asymptotic Analysis of Biased Stochastic Approximation Scheme

B. KARIMI, HOI-TO WAI, B. MIAOJEDOW AND E. MOULINES

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

### Efficient Metropolis-Hastings sampling for nonlinear mixed effects models

B. KARIMI AND M. LAVIELLE

- To be published in Springer Series Statistics and Data Science: new challenges, new generations

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

B. KARIMI, M. LAVIELLE AND E. MOULINES

- Computational Statistics and Data Analysis, Volume 141, January 2020, Pages 123-138

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

B. KARIMI, M. LAVIELLE AND E. MOULINES

- pre-print

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

B. KARIMI, M. LAVIELLE AND E. MOULINES

- ICML 2017 Implicit Models Workshop

## Talks and Posters

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### 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)

## Awards

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- 2019 **Jacques Hadamard Researcher Grant**, Samsung AI - HSE Lab visiting scholar grant  
2019 **Student travel award**, COLT Conference  
2018 **Young researcher travel award**, BAYSM Conference  
2017 **Jacob Startup Competition**, Agora Pitch, 4th place

*Moscow, RU*  
*Phoenix, USA*  
*Warwick, UK*  
*Bremen, DE*

## Teaching

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2017-2018 **MAP534: Machine Learning**, Msc Polytechnique-HEC

*Palaiseau, FR*

2017-2018 **MAP535: Regression**, Msc Polytechnique-HEC

*Palaiseau, FR*

2017-2018 **Bayesian Statistics**, Msc Data Science Ecole Polytechnique

*Paris, FR*

2018 **Innovation & Technology**, 3A Ecole Polytechnique

*Palaiseau, FR*