# Thibaut Montes

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## RESEARCH PROJECTS

### OPTIMAL QUANTIZATION

- New **Weak Error** bounds and expansions for **Optimal Quantization** (Published in *Journal of Computational and Applied Mathematics*: **link**).
- Optimize existing methods in order to build optimal quantizers: **Fixed Point Research Acceleration**, **Gradient descent**.
- **Quantization**-based Bermudan option pricing in the $FX$ world (Paper Submitted: **arXiv link**).
- Stationary Heston model: Calibration and Pricing of exotics using **Product Recursive Quantization** (Paper in progress).

### MULTILEVEL MONTE-CARLO

- Optimizing xVA's risk (counterparty risk) computation using Multilevel Monte-Carlo that allows us to ***kill the bias*** while **reducing the variance** of the estimator.

## LINKS

Website:// **montest.github.io**
Github:// **montest**
LinkedIn:// **thibaut-montes-194a77a9**

## SKILLS

### PROGRAMMING

- Over 5000 lines:
  **C++** (Creation of libraries) ◇ LaTeX
- Over 1000 lines:
  **Python** (Binding of C++ libraries using Pybind11 - **PyTorch**) ◇ **Scala** (just for fun)
- Discovering:
  **Kafka** ◇ **MongoDB**

### LANGUAGES

- French: native
- English: fluent

## INTERESTS

Running ◇ Trails

## EDUCATION

### PHD CIFRE IN NUMERICAL PROBABILITY | Laboratoire de Probabilités, Statistiques et Modélisation (LPSM) | Sorbonne University (ex Paris VI)

Mar 2017 – Feb 2020 (expected) | Paris, France
Under the direction of **Gilles Pagès** and **Vincent Lemaire** at the LPSM and the supervision of **Jean-Michel Fayolle** at the Independent Calculation Agent, a Fintech whose aim is to efficiently compute risk measures linked to counterparty default. My research subjects are Optimal Quantization, also known as K-means, and Multilevel Monte-Carlo methods.

### RESEARCH MASTER IN PROBABILITY AND FINANCE (WITH HONORS) | Sorbonne University (ex Paris VI) in collaboration with Ecole Polytechnique

Sep 2014 – Jun 2016 | Paris, France

- Numerical Probability (Monte-Carlo, Sensitivities Computation, . . .).
- Stochastic Algorithms (Stochastic Gradient Descent, . . .).
- Stochastic Calculus and Control.
- Machine Learning.

### BACHELOR DEGREE IN MATHEMATICS (WITH HONORS) | Aix-Marseille University

Sep 2011 – Jun 2014 | Paris, France
Third year of the Bachelor on exchange with the ERASMUS program in the Lund University's mathematics department, Lund, Sweden.

## PROFESSIONAL EXPERIENCE

### QUANTITATIVE RESEARCHER | The Independent Calculation Agent

From Nov 2016 | Paris, France
As PhD candidate in collaboration with The ICA, I worked on the following projects:

- Optimizing the ICA's analytic library using Optimal Quantization based methods (Pricing of Exotic Options in the interest rate world).
- Identifying and *killing* bias in the xVA computation using Multilevel Monte-Carlo methods.
- Implementing new regulatory risk measures in the library.

### INTERN | The Independent Calculation Agent

May 2016 – Oct 2016 | Paris, France
Optimization of financial products pricing and risk measures sensitivities computations (Malliavin calculus and finite differences methods).

### INTERN | LPSM (former LPMA), under the direction of Daphné Giorgi and Vincent Lemaire

Jun 2015 – Jul 2015 | Paris, France
Numerical simulation of short rate models (Vasicek Model) using trinomial trees. The results of the project can be accessed at the following link: **Trinomial Trees Simulation**