



# Guillaume Metzler

PhD Candidate

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07 Janvier 1992 - Haguenau

27 ans

Permis B

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## Experiences

- January 2016 - **PhD Student - Laboratoire Hubert Curien University of Saint-Etienne.**  
September 2019 *Learning from Imbalanced Data: an Application to Bank Fraud Detection*  
• Topics of research: Statistical Theory - Optimization - Supervised Learning - Imbalanced Classification - Metric Learning
- January 2016 - **R&D Engineer - Data Scientist, Blitz Business Service Company, Villefontaine.**  
January 2019 *Company working on check Fraud detection, their main costumers are the supermarket distribution. Main tasks :*  
• Implement the current system using a free software (**R**),  
• Working with graphs and loyalty cards to improve the fraud detection system,  
• Include the notion of profits of a supermarket in the fraud detection model.  
• Working with Linear Discriminant Analysis and Random Forest to improve the current model with sampling methods.
- 2015 **R&D Engineer, Blitz Business Service Company, Villefontaine.**  
October - *Fixed-term employee before starting my PhD. Knowledge around the notion of Fraud and*  
December *Anomaly detection. Working on False checks and implement some strategies using Boosting Methods combine with SVM and basics optimization algorithms, muldi-dimensional scaling.*
- 2015 **Internship at INRIA Villeurbanne (Team Dracula), Supervisors: Fabien**  
March - *Crauste et Olivier Gandrillon.*  
September *Study the variability of Immune Response in a population of mice using Mixed Effect Model. Building a model of Ordinary Differential Equations and use the Data to fit the parameters of the model using an SAEM algorithm (Implemented in Monolix). (6 months)*
- 2014 **Internship at ICPEES (CNRS Strasbourg), Supervisor : Guy Schlatter.**  
June - July *Modeling using finite element of the Eletrospinning process (6 weeks).*

## Education

- January 2016- **PhD Student: Machine Learning, University of Jean-Monnet - Saint-Etienne, ,**  
September 2019 *PhD on the topic of Fraud and Anomaly Detection.*
- 2012 – 2015 **Magistere: Mathematics, University of Strasbourg, Fundamental and Applied Mathematics with honors, rank: 4/12 during the first year, rank: 5/12 during the second year.**
- 2014 – 2015 **Master 2: Applied Mathematics, University of Claude Bernard Lyon 1, Mathematics applied to Biology and Medicine with distinction.**
- 2013 – 2014 **Master 1: Fundamental Mathematics, University of Strasbourg, Fundamental and Applied Mathematics with distinction, rank: 8/28.**
- 2012 – 2013 **Bachelor: Fundamental Mathematics , University of Strasbourg, Fundamental and Applied Mathematics with honors, rank: 7/65.**
- 2010 – 2012 **"Classe Préparatoire aux Grandes Ecoles (CPGE)", MPSI-MP, Lycée Kléber, Strasbourg.**
- 2010 **Baccalauréat Scientifique, Alphonse Heinrich High School - Haguenau, Option Mathematics, With Honors.**

## Teaching Assistance

2018-2019 **Master 1: Optimization & Operational Research**, *Convex Sets and Functions, University of Linear Algebra, Gradient Descent Algorithm and its variants, Application to Logistic Jean Monnet Regression, Condition Number, Practical Session using  $\mathbf{R}$* , (14 hours).

2017-2018 **Master 1: Optimization & Operational Research**, *Convex Sets and Functions, University of Linear Algebra, Gradient Descent Algorithm and its variants, Application to Logistic Jean Monnet Regression, Condition Number, Practical Session using  $\mathbf{R}$* , (18 hours).

**Master 1: Introduction in Machine Learning**, *Generalization, Cross-Validation, k-NN algorithm, Bayesian Approaches*, (6 hours).

2016-2017 **Master 1: Optimization & Operational Research**, *Convex Sets and Functions, University of Linear Algebra, Gradient Descent Algorithm and its variants, Practical Session using Jean Monnet  $\mathbf{R}$* , (10 hours).

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## Publications

### Journals



**Learning maximum excluding ellipsoids from imbalanced data with theoretical guarantees**, *G. Metzler, X.Badiche, B.Belkasmi, E. Fromont, A. Habrard and M. Sebban*, Pattern Recognition Letter, 2018.

### International Conferences



**Tree-based Cost Sensitive Methods for Fraud Detection in Imbalanced Data**, *K.Bascol, R.Emonet, E. Fromont, A.Habrard, G.Metzler and M.Sebban*, In Proceedings in the 22nd International Conference on Artificial Intelligence and Statistics (AISTATS) , Naha, Okinawa, Japan, April 2019 .



**Tree-based Cost Sensitive Methods for Fraud Detection in Imbalanced Data**, *R.Viola, R.Emonet, A.Habrard, G.Metzler, S.Riou and M.Sebban*, In Proceedings in the 31st International Conference on Tools with Artificial Intelligence (ICTAI) , Portland, Oregon, USA, November 2019 .



**Tree-based Cost Sensitive Methods for Fraud Detection in Imbalanced Data**, *G. Metzler, X.Badiche, B.Belkasmi, E. Fromont, A. Habrard and M. Sebban*, In Proceeding in International Symposium on Intelligent Data Analysis (IDA), 's-Hertogenbosch, Netherlands, October 2018.

### National Conferences



**CONE : Un algorithme d'optimisation de la F-Mesure par pondération des erreurs de classification**, *R. Viola, R. Emonet, A. Habrard, G. Metzler, S. Riou and M. Sebban*, Conférence sur l'Apprentissage Automatique (CAp), Toulouse, France, 2019.



**CONE : Un algorithme d'optimisation de la F-Mesure par pondération des erreurs de classification**, *K. Bascol, R. Emonet, E. Fromont, A. Habrard, G. Metzler and M. Sebban*, Conférence sur l'Apprentissage Automatique (CAp), Rouen, France, 2018.



**Apprentissage de sphères maximales d'exclusion avec garanties théoriques**, *G. Metzler, X.Badiche, B.Belkasmi, S. Canu, E. Fromont, A. Habrard and M. Sebban*, Conférence sur l'Apprentissage Automatique (CAp), Grenoble, France, 2017.

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## Computer Skills

$\mathbf{R}$ , Scilab, Maple, Monolix, Feel ++,  $\text{\LaTeX}$

## Languages

English University level

*10 years of study – TOEIC : 710 / 990*

German CPGE level

*9 years of study*

## Other Activities

Sport Running, Cycling, Fitness

Jobs 2010 – Working as Logistician during the summer (SCHAEFLER France) 4x8, 2x8  
2014

Teaching Mathematics and Physics for students in high school and 1B.