Guillaume **Metzler**

Postdoctoral Researcher

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Experiences

October 2019 - ... **Postdoctoral Researcher - Hubert Curien Laboratory University of Saint-Etienne**.

January 2016 - September 2019 **PhD Student - Hubert Curien Laboratory University of Saint-Etienne**.
Learning from Imbalanced Data: an Application to Bank Fraud Detection
• *Topics of research: Statistical Theory - Optimization - Supervised Learning - Imbalanced Classification - Metric Learning*

January 2016 - January 2019 **R&D Engineer - Data Scientist, Blitz Business Service Company, Villefontaine**.
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 October - December **R&D Engineer, Blitz Business Service Company, Villefontaine**.
Fixed-term employee before starting my PhD. Knowledge around the notion of Fraud and Anomaly detection. Working on False checks and implement some strategies using Boosting Methods combine with SVM and basics optimization algorithms, muldi-dimensional scaling.

2015 March-September **Internship at INRIA Villeurbanne (Team Dracula)**, Supervisors: Fabien Crauste et Olivier Gandrillon.
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 June - July **Internship at ICPEES (CNRS Strasbourg)**, Supervisor : Guy Schlatter.
Modeling using finite element of the Eletrospinning process (6 weeks).

Education

January 2016- September 2019 **PhD Student: Machine Learning**, *University of Jean-Monnet - Saint-Etienne,* , PhD on the topic of Fraud and Anomaly Detection, Defended the 25^{th} September 2019.

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

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

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

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

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

An Adjusted Nearest-Neighbor Algorithm Maximizing the F-Measure from 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 .

From Cost-Sensitive Claissification to Tight F-Measure Bounds, *K. Bascol, R. Emonet, 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 .

IDA 2018

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 : Une version ajustée de l'algorithme des plus proches voisins maximisant la F-mesure, *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.

Computer Skills

R, Scilab, Maple, Monolix, Feel ++, LaTeX

Languages

English	University level	*10 years of study – TOEIC : 710 / 990*
German	CPGE level	*9 years of study*

Other Activites

Sport	Running, Cycling, Fitness
Jobs 2010 – 2014	Working as Logistician during the summer (SCHAEFLLER France) 4x8, 2x8
Teaching	Mathematics and Physics for students in high school and 1B.