Joachim Bona-Pellissier

Curriculum Vitae

MaLGa Center
Università di Genova
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Current position

2023 – present **Postdoctoral researcher**, *Machine Learning Genoa Center (MaLGa), Università degli Studi di Genova*, Italy.
Under supervision of Prof. Lorenzo Rosasco.
Topics of interest: Physics-informed machine learning, Kernel methods, Theoretical foundations of deep learning, Geometry of ReLU networks.

Education

2019 – 2023 **Ph.D. in Applied Mathematics**, *Institut de Mathématiques de Toulouse, ANITI (Artificial and Natural Intelligence Toulouse Institute), Toulouse 1 Capitole University*, Toulouse, France.
Under supervision of Prof. François Malgouyres and Prof. François Bachoc.
Subject: On the Identifiability of Deep ReLU Neural Networks.

2018 – 2019 **M.Sc. in Mathematics, Computer Vision and Machine Learning (with high honors)**, *ENS Paris-Saclay.*
Courses: Theoretical foundations of Deep Learning, Probabilistic graphical models, Introduction to numerical imagery, Introduction to medical image analysis, Topological data analyis, Prediction for individual sequences, Analysis of longitudinal data and applications to health, Geometry and space of shapes.

2017 – 2018 **Agrégation in Mathematics (national rank: 47)**, *ENS Paris-Saclay*, Probability and Statistics minor.
French Agrégation is the highest national competitive entrance examination for teachers. The accepted candidates are ranked by success order.

2016 – 2017 **Master's degree in Fundamental Mathematics (with high honors)**, *Grenoble Alpes University.*
Research work on the Berkovich disk (p-adic analysis), supervised by Andrea Pulita.

2015 – 2016 **B.Sc. in Fundamental Mathematics**, *ENS de Lyon.*

2012 – 2015 **Math & Physics undergrad studies (prépa MPSI - MP*)**, *Lycée Champollion*, Grenoble.

Publications

2023 **Parameter identifiability of a deep feedforward ReLU neural network**
Joachim Bona-Pellissier, François Bachoc, and François Malgouyres.
In: Machine Learning, 112(11), 4431-4493.

2022 **Local Identifiability of Deep ReLU Neural Networks: the Theory**
Joachim Bona-Pellissier, François Malgouyres and François Bachoc.
In: NeurIPS, Thirty-Sixth Conference on Neural Information Processing Systems.

Talks

2026 **MATH4AIML - UMI Workshop**, *Sapienza Università di Roma* , Italy.
"Universal physics-informed machine learning with kernels."

2025 **Représentations Neuronales Implicites : des NeRF aux PINN**, *Institut Henri Poincaré*, Paris, France.
"Universal physics-informed machine learning with kernels."

2025 **NPTwins**, *Università di Messina*, Italy.
"Universal physics-informed machine learning with kernels."

2024 **MML seminar**, *Max Planck Institute MIS + UCLA*, Online.
"Geometry-induced Implicit Regularization in Deep ReLU Neural Networks."

2022 **3IA Doctoral Workshop**, *MIAI institute, Université Grenoble Alpes*, Grenoble, France.

2022 **Research school "Statistical and geometric discrepancies for machine learning"**, *Centre Henri Lebesgue*, Rennes, France.

Mentoring

2025 **Mathis Guichet**, *research intern at MaLGa*, master level (M2).

2024 **Rayan Autones**, *research intern at MaLGa*, master level (M1), "Error analysis of kernel methods for solving elliptic partial differential equations."

Internships

2019 **Research intern at IRT Saint-Exupéry**, Toulouse, supervised by François Malgouyres and Grégory Flandin.
I worked with the DEEL team on the question of identifiability and interpretability of neural networks.

2016 **Research intern at Aix-Marseille Université**, supervised by Guillemette Chapuisat.
I worked on the modeling of tumor heterogeneity for cancer treatments.

Teaching

2022 – 2023 **Deep Learning practical**, *Graduate (mathematics)*, Paul Sabatier University, Toulouse.
Introduction to MLPs, CNNs, Autoencoders, U-nets... Introduction to Keras, Tensorflow, Scikit-learn.

2022 – 2023 **Optimization practical**, *Graduate (mathematics)*, Paul Sabatier University, Toulouse.
First order methods, Newton/quasi-Newton methods. Quadratic problems, SQP method.

2022 – 2023 **Machine Learning tutorial & practical**, *Undergraduate (mathematics)*, Paul Sabatier University, Toulouse. Linear regression, ridge and LASSO penalization, KNN, logistic regression, SVM, K-means.

2022 – 2023 **Linear Algebra tutorial**, *Undergraduate (mathematics)*, Paul Sabatier University, Toulouse.
Euclidian and hermitian spaces, isometries, spectral theorem, quadratic forms, and more.

2021 – 2022 **Math oral examinations**, *Undergraduate (mathematics)*, Paul Sabatier University, Toulouse.
Topology, Algebra, Differential calculus.

2020 – 2022 **Convex Optimization tutorial (in English)**, *Graduate (finance)*, Toulouse School of Management.
Optimization without or with constraints, Lagrange Theorem, KKT Conditions.

2019 – 2022 **Methods of math. analysis tutorial**, *Undergraduate (management and business administration)*, Toulouse 1 Capitole University. Introduction to Probabilities, Statistics and Financial Mathematics.

2019 – 2020 **Math oral examinations**, *Undergraduate (mathematics and social sciences)*, Toulouse School of Economics. Introduction to Series, Probability, Integral Calculus.

2018 – 2019 **Math oral examinations**, *Undergraduate (Classes prépa MP)*, Lycée Fénelon Sainte-Marie, Paris.
Algebra, Topology, Integral Calculus, Differential Calculus, Functional analysis, ODEs, Probability.

2016 – 2017 **Student mentoring**, *3rd year bachelor (L3) in mathematics*, Grenoble Alpes University.

Languages

French	Native language
Spanish	Fluent
English	Fluent
Italian	Proficient