

# Ottavio Khalifa

48, rue du Général Leclerc, 94270 Le Kremlin-Bicêtre  
0661703068 | [ottavio.khalifa@inserm.fr](mailto:ottavio.khalifa@inserm.fr) |

## EDUCATION

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<b>Sorbonne Université</b> <i>Master in Pure Mathematics</i> <u>Classes</u> : Algebraic Topology, Homotopy theory, Riemannian Geometry, Galois Theory.	Paris 2019-2022
<b>ENSAE Paris, Institut Polytechnique de Paris</b> <i>Master in Statistics and Machine Learning</i> <u>Specialities</u> : Optimization, Machine Learning, High Dimensional Statistics, Optimal Transport, Deep Learning, Bayesian Statistics, Reinforcement Learning, Compressed Sensing.	Palaiseau 2017 – 2021
<b>Lycée Charlemagne</b> <i>Preparatory classes, Mathematics Major, MPSI-MP*</i> <u>Classes</u> : Mathematics, Physics, Computer Science, Literature and Philosophy.	Paris 2015 – 2017

## WORK EXPERIENCE

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<b>Ph.D. Student</b> <i>Center of research in Epidemiology and Statistics, Methods Team</i> Unsupervised Learning and Topological Data Analysis applied to Biostatistics. Supervised by François Petit.	2023-2025
<b>Mathematics Teacher</b> <i>Ecole Alsacienne, Paris</i> Mathematics teacher in middle school (8th and 10th grade).	2022-2023
<b>Research Intern</b> <i>INRIA Sophia Antipolis, Datashape, supervised by Mathieu Carrière.</i> Evaluation metrics and parameter selection for the Mapper.	2022
<b>Research Intern</b> <i>Paris University, LPSM, supervised by Eddie Aamari.</i> Bibliographic research in topological data analysis and persistent homology. Implementation and comparison of various methods of vectorization for persistence diagrams.	2021
<b>Oral Evaluator in Mathematics</b> <i>Lycée Charlemagne, MPSI</i> Training students of Preparatory Classes in Mathematics, for the French "Grandes Ecoles" competitions.	2018 – 2021

## ACADEMIC PROJECTS

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<b>ENSAE Paris, Optimal Transport Project</b> <i>Title : Parametric Estimation with Wasserstein Distance.</i> Supervised by Marco Cuturi. M-estimation using the Wasserstein Distance. Python implementation, robustness tests and proposals for improvement.	2021
<b>ENSAE Paris, Deep Learning Project</b> <i>Title : Harmonizing Melodies in the style of Bach Chorals.</i> Supervised by Marco Cuturi. Music Generation in the style of Bach using LSTM and Transformer Models. Evaluation using a Wasserstein-based grading function.	2021
<b>Sorbonne Université, Pure Mathematics Thesis</b> <i>Title : Some methods of resolution for the inverse Galois problem.</i> Supervised by Cyril Demarche. Presentation and resolution of some particular cases of the inverse Galois problem, with the Hilbert irreducibility theorem.	2020

## SKILLS

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**Languages** : French (Native), English (B2), Italian (B2)  
**Programming** : Python, R, CamL,  $\text{\LaTeX}$ .  
**Frameworks** : Numpy, Pandas, Scikit-learn, Pytorch, Tensorflow, Gudhi.