Marina **KRÉMÉ**
Ph.D. in applied Mathematics

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Research Experience

Since Oct 2023 — Assistant Professor in applied Mathematics and Data Science, LIMOS, Mines Saint-Etienne, France

Audio inpainting | TIme-frequency analysis | Fourier analysis | Optimization | Data Science | Signal processing | Python | LaTeX

March 2022 to Sep 2023 — Postdoctoral researcher in Audio Signal Processing, MULTISPEECH, INRIA, Nancy, France

- Formulation of the time-domain inpainting problem
- Proposal of closed-form solution for time-domain inpainting
- Theoretical study of the uniqueness of the closed-form solution of time-domain inpainting problem
- Experimental study for estimating the observations for time-domain inpainting

Audio inpainting | Fourier analysis | Optimization | applied Harmonic Analysis | Python | LaTeX

sep 2021 to fev 2022 — Research as an ATER in Signal Processing and Optimization, I2M & LIS, Aix-Marseille University, France

- Perform *phase inpainting* locally in the time-frequency plane.
- Reformulate the phase inpainting problem
- Manage the complexity problems in case of phaselift for phase inpainting problem

Phase inpainting | Time-frequency | Optimization | low-complexity | Gabor atoms | Matlab | LaTeX

2017 to 2021 — PhD researcher in Signal Processing and Optimization, I2M & LIS, Aix-Marseille University, France

- Formulation of the *phase inpainting problem in the time-frequency plane*
- Developpement of algorithms for the resolution of phase inpainting
- Design of a new filter design method called Time-Frequency Fading (TFF)
- Developpement of algorithms for TFF

My thesis was funded by the Provence-Alpes-Côte d'Azur (PACA) region as part of the "Emplois Jeunes Doctorants" project. I realized it in collaboration with the industrial partner ANSYS based in Aix en provence.

Audio inpainting | Phase reconstruction | Time-frequency | Optimization | Gabor Multiplier | Filtering | Randomized SVD | Matlab | Python | LaTeX

2017 — March to September — Research intership in signal Processing and Machine Learning, Laboratoire d'Informatique Fondamentale (LIF), Aix-Marseille University, France

- **Supervisors:** Valentin Emiya - Caroline Chaux - Bruno Torrésani
- Subject: **Phase reconstruction for audio inpainting.**
  - Study and development of positive semidefinite optimization methods for audio inpainting.
  - Design of an approach for audio inpainting taking into account the known phases.

Audio Inpainting | Optimization | Machine Learning | Matlab | Python | Latex

2016-2017 — November to March — Master Project (Travail Encadré de Recherche), Institut de Mathématiques de Marseille (I2M), Aix-Marseille University, France

- **Supervisors:** Pierre Pudlo - Frédéric Richard
- Subject: **Study of mixing models for classification/Classification of the different types of cloud cover on satellite images**
- Development of an EM algorithm for the study of Gaussian and Student mixtures.
- Implementation and test on two blood samples.
- Implementation of a classification algorithm for the distinction of the different profiles of cloud coverage in images provided by the satellite Sentinel 2.

EM algorithm | Classification | Mixing models | R | Matlab

2015 — March to July

Research intership in Statistics, Institut de Recherche Mathématiques-IRMA, Université de Cocody Abidjan, Côte d'Ivoire.

- **Supervisor:** Armel Yodé
- Subject: **Estimation of a multivariate density - oracle approach.**
  - Studying density estimation methods using Oracle approaches.

Estimation | Non-parametrics statistics | Oracle approch | Latex

Publications

2023 Louis Bahrman, **Marina Krémé**, Paul Magron, Antoine Deleforge. Signal Inpainting from Fourier Magnitudes. Paper on Hal, **EUSIPCO 2023**

2022 **Marina Krémé**, Bruno Torrésani, Antoine Deleforge. Local time-frequency fading. International Congress on Acoustics (ICA),Oct 2022 Paper on Hal

2022 **Marina Krémé**, Bruno Torrésani. Étude d'un algorithme d'optimisation pour le fading temps-fréquence. GRETSI 2022 - XXVIIIème Colloque francophone de traitement du signal et des images, Sep 2022, Nancy, France. Paper on Hal

2021 **Marina Krémé**, Valentin Emiya, Caroline Chaux, Bruno Torrésani. Time-Frequency Fading algorithms based on Gabor multipliers. IEEE Journal of Selected Topics in Signal Processing, 2020 (15), 65-77. DOI: 10.1109/JSTSP.2020.3045938.

2020 **Marina Krémé**, Valentin Emiya , Caroline Chaux, Bruno Torrésani. Filtering out time-frequency areas using Gabor multipliers. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), May 2020. DOI: 10.1109/ICASSP40776.2020.9053482.

2018 **Marina Krémé**, Valentin Emiya, Caroline Chaux. Phase inpainting in time-frequency plane. iTWIST: international Traveling Workshop on Interactions between low-complexity data models and Sensing Techniques. Paper on Hal.

2018 **Marina Krémé**, Valentin Emiya, Caroline Chaux. Phase reconstruction for time-frequency inpainting. International conference on Latent Variable Analysis and Signal Separation (LVA/ICA), July 2018, Guildford, United Kingdom. Paper on Hal.

Education

2017-2021 **Ph.D. student** in Applied Mathematics : Audio Inpainting in the time-frequency plane
Aix-Marseille University, France.

2016-2017 **Master's degree** in Mathematics specialized in Computer Science, Statistics, Signal, Health
Aix-Marseille University, France.

2013-2015 **Master's degree** in applied Mathematics specialized in Probabilities and Statistics
International University of Applied Sciences and Technologies, Abidjan, Côte d'Ivoire.

2008-2013 **Bachelor's degree**, in Mathematics and Computer Science.
Université de Cocody Abidjan, Côte d'Ivoire.

2007-2008 **Scientific Baccalaureate with honours**
Lycée Moderne Adzopé, Côte d'Ivoire.

Teaching Experience

2023— **Lecture classes and practical exercises, Mines Saint-Etienne, France**

- Master Data Science (M1): SVM for classification.
- Master Data Science (M1): Optimization.
- Bachelor (L3): Numerical Methods
- Bachelor (L3): Signal processing and time series.

Fourier analysis | optimization | Linear Algebra | Probabilities | Statistics | Classification | Linear regression | SVM | Python | LaTeX

2017-2022 | **Lecture classes and practical exercises (414 hours), Aix-Marseille University, France**

- Master Signal and Image Processing (M1): Mathematics for signals and images.
- Master Computer Science (M1): Introduction to Data Science.
- Bachelor of Mathematics (L2): Statistics and Probabilities.
- Engineering Schools Polytech (PeiP): Linear Algebra.
- Bachelor of Biology (L2): Statistics and Probabilities.
- L1 portail Curie: Mathematics 1
- L1 portail Descartes: analysis

Fourier analysis | Wavelets | Linear Algebra | Probabilities | Statistics | Classification | Linear regression | KNN | Decision trees | Random Forests | Matlab | Python | LaTeX

2015-2016 | **Mathematics teacher at Jules Ferry College, Abidjan, Côte d'Ivoire**

- Teaching mathematics to middle school students

Selected talks

October, 2022	**ICA Conference**: Local time-frequency fading, Gyeongju, South korea.
May, 2020	**ICASSP Conference**: Filtering out time-frequency areas using Gabor multipliers, Barcelona, Spain (Online conference).
June, 2019	**Wavelets and Beyond - A celebration for Alexandre Grossmann and Yves Meyer**: Phase inpainting in time-frequency plane (Poster presentation), Orsay, France.
November, 2019	**3rd Merlin meeting Workshop**: Filtering out time-frequency areas using Gabor multipliers,Vienna, Austria.
November, 2018	**iTWIST'18 Workshop**: Phase inpainting in time-frequency plane, CIRM-Luminy, Marseille, France.
July, 2018	**LVA/ICA Conference**: Phase reconstruction for time-frequency inpainting, Guildford, United Kingdom.

Computer Science Skills

Programming Languages	**Matlab**, **Python**, **Latex**, Java, R, C, html
Matlab librairies	**LTFAT**, **Signal processing**, Optimization
Python librairies	**Numpy**, **Sklearn**, pandas, Matplotlib
Others	**Object Oriented Programing (OOP)**

Languages

French	●●●●●
English	●●●●○
Spanish	●●○○○

Extracurricular activities

Hobbies	Gardening, Reading, Traveling, Handball, Dancing
October, 2020	**Cicadas Conference:** a Math camp for high school girls, CIRM-Luminy, Marseille.
December, 2020	Organizing the event **13 minutes young researcher**, Parc-Chanot, Marseille, France
December, 2019	**Researcher in Class** in Middle and high schools, Marseille, France.
September, 2018	**European Researchers' Night** - Shifumi IA
June 2017 to today	**Volunteering school accompaniment**. ESA Association, Marseille, France