

# Geoffroy Oudoumanessah

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## Profile

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Third-year PhD student in statistical learning and medical imaging at the French National Institute for Research in Digital Science and Technology (Inria) and the French National Institute of Health and Medical Research (Inserm).

## Education

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**École Normale Supérieure Paris-Saclay** Sept 2021 – Sept 2022

*Master's Degree in Mathematics, Vision and Learning (MVA)*

- High Honors (16.6/20)
- Image Analysis, Statistical Learning, Neuroscience, Kernel Methods, Convex Optimization

**Grenoble-INP, ENSIMAG** Sept 2018 – Sept 2021

*Engineering Degree in Mathematics and Computer Science*

- Honors (15.8/20)
- Computer Architecture, Language Theory and Compilation, Object-Oriented Programming

**Preparatory Classes, Lycée Michel Montaigne in Bordeaux** Sept 2015 – Sept 2018

## Experience

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**PhD Student in Statistical Learning and Medical Imaging** Grenoble, France  
*Inria Grenoble & Grenoble Institute of Neuroscience* Oct 2022 – Present

- Supervised by Florence Forbes (Inria, CNRS), Michel Dojat (Inserm), Carole Lartizien (Inserm, CNRS)
- Optimization of MRI acquisition by combining [diffusion models](#) and [Bayesian experimental design](#)
- Development of [elliptical mixture models](#) trained with [stochastic learning](#)
- Compression and reconstruction of [magnetic resonance fingerprinting](#) signals for the brain
- **Applications:** MRI, anomaly detection, data compression

**Research Intern** Grenoble, France  
*Inria Grenoble & Grenoble Institute of Neuroscience* April 2022 – Sept 2022

- Design and implementation of a [stochastic expectation-maximization](#) algorithm for a mixture model of [multivariate Student distributions](#)
- **Application:** Anomaly detection in *de novo* Parkinson's disease patients

**Research Intern** Montpellier, France  
*Laboratory of Computer Science, Robotics and Microelectronics of Montpellier* Sept 2020 – Feb 2021

- Detection of image corruption and *deepfakes* using [deep learning](#)

**Engineering Development Intern** Bordeaux, France  
*Nurea* June 2019 – August 2019

- Testing the robustness of a *deep learning* model for segmenting [aneurysms](#) in CT scans

## Publications (first contributions underlined)

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### Work in Progress

- Iollo, J., Oudoumanessah, G. et al. (2025). Active MRI Acquisition with Diffusion Guided Bayesian Experimental Design. *preprint*.
- Oudoumanessah, G. et al. (2025). Scalable magnetic resonance fingerprinting: Incremental inference of high dimensional elliptical mixtures from large data volumes. Submitted for publication to *Annals of Applied Statistics*.

### Publications

- Oudoumanessah, G. et al. (2025). Cluster globally, Reduce locally: Scalable efficient dictionary compression for magnetic resonance fingerprinting. IEEE International Symposium on Biomedical Imaging.
- Henrik Häggström, Rodrigues, P., Oudoumanessah, G. et al. (2025). Fast, accurate and lightweight sequential simulation-based inference using Gaussian locally linear mappings. Transactions on Machine Learning Research.
- Oudoumanessah, G. et al. (2025). Robust Subspace Clustering Approach for High-Dimensional MRF: Novel Simultaneous Clustering and Dimensionality Reduction at Scale. International Society for Magnetic Resonance in Medicine.
- Oudoumanessah, G., et al. (2024). Towards frugal unsupervised detection of subtle abnormalities in medical imaging. International Conference on Medical Image Computing and Computer-Assisted Intervention.
- Pinon, N., Oudoumanessah, G., et al. (2023). Brain subtle anomaly detection based on auto-encoders latent space analysis: application to de novo parkinson patients. IEEE International Symposium on Biomedical Imaging.
- Oudoumanessah, G., et al. (2023). Incremental estimation for unsupervised detection of multivariate anomalies in medical imaging. GRETSI 2023-XXIXth French-speaking Colloquium on Signal and Image Processing.

## Selected Oral Presentations and Posters

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### Oral Presentations

- French-speaking Colloquium on Signal and Image Processing (2023): Incremental estimation for unsupervised detection of multivariate anomalies in medical imaging.
- IEEE International Symposium on Biomedical Imaging (2023): Brain subtle anomaly detection based on auto-encoders latent space analysis: application to de novo parkinson patients.
- AI Challenges Auvergne-Rhône-Alpes (2023): 5-minute thesis pitch.

### Posters

- International Conference on Medical Image Computing and Computer-Assisted Intervention (2024): Towards frugal unsupervised detection of subtle abnormalities in medical imaging.
- French Colloquium on Artificial Intelligence in Biomedical Imaging (2024): Reconstruction of T1, T2, T2\* parameters for magnetic resonance fingerprinting.
- French Colloquium on Artificial Intelligence in Biomedical Imaging (2023): Frugal anomaly detection in *de novo* Parkinson's disease patients.

## Teaching

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### Part-time Lecturer

Grenoble INP - ENSIMAG

Grenoble, France

2023 – 2025

- **Probabilistic Methods for Learning** (60h) - For Master's level students.
- **Statistical Principles and Methods** (30h) - For Bachelor's level students.

## Skills / Hobbies

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- **Programming:** Python, Jax, Pytorch, Scikit-learn, Numpy, Pandas, Geopandas, Rasterio, Xarray
- **Hobbies:** Amateur Cycling, Cooking and Pastry, Large Language Models, Mountain Activities