# Maxime RONCERAY

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## Projects

2025 – 2026 **University of Tours — Blois Campus** — Master's Thesis (Research Project)
*Instituto de Astrofísica de Canarias (IAC) — IAC Deep*
**Supervisors: Marc Huertas-Company, Alexandre Chanson**
*Ongoing research collaboration (Malgorzata Siudek - IAC)*

*Benchmarking foundation models for unsupervised discovery in large multimodal astrophysical datasets*
Research project extending beyond the Master's thesis; **paper accepted at the ICLR 2026 Workshop.**
Implementation of anomaly detection methods applied to foundation multimodal models (AION, AstroPT, AstroCLIP).
Multimodal Transformers, VQ-VAE fine-tuning, Isolation Forest, Normalizing Flows.
**Scientific outreach:** presentation as a poster during the Data Science Day (audience: students & researchers, vulgarization of research results)

2024 – 2025 **University of Tours - Blois Campus** Master Degree
*Astrodeep - CNRS - APC Paris*
*Data Analysis from the APOGEE Program (SDSS)*
Benchmark of differents dimensionality reduction methods (PCA, VAE, Autoencoder, Umap, t-SNE ...).
https://github.com/astrodeepnet/students-project-2024

## Professional Experience

Fall 2025 **CNRS** AI for Science, Science for AI (AISSAI)
*Astroinfo 2025: School + Hackathon*
https://github.com/astroinfo-hacks/2025-fondation-models

Summer 2025 **CNRS** Thematic Summer School "Euclid COSMOLOGY 2025"
Introduction to modern cosmology fundamentals, including galaxy clustering, gravitational lensing, dark matter, CMB, and introducing simulations, machine learning, and scientific software tools (Python, COBAYA, Euclid tools).

2025 – 3 months **OSUC** Observatory of the Universe Sciences
Evaluation of AI Potential within the DOC-Rivers Project: Remote Sensing of Dissolved Organic Carbon in Arctic Rivers
HPC Computation and job parallelization - Knowledge transmission - Machine-Learning (Mixture of Experts)

2024 – 4 months **CNRS** Laboratory of Plasma Physics (LPP) - *l'X - Ecole Polytechnique (IP Paris)*
Development of a simulation code for a search-coil type magnetic sensor
SPICE Electromagnetic and Mechanical Kinetic Simulation
Optimization of sensor parameters
**Scientific outreach:** poster presentation during the *Fête de la Science* at École Polytechnique (audience: laboratory members & researchers; presentation of the application and its scientific objectives)

## Professional Experience (continued)

2023 – 3 months
**CNRS** Laboratory of Physics and Chemistry of the Environment and Space(LPC2E) *- ESA - NASA (HELIOSWARM)*
Development of an interface for automating the testing of space instruments
Working with hardware, automatic measurements and software control of an oscilloscope using an SDK, signal processing and analysis

Summer 2023
**CNRS** AI for Science, Science for AI (AISSAI)
*Astroinfo Hack : Galaxy classification from SFH, a time series approach*
Clustering based on the shape of the Star Formation History (SFH) of galaxies
Data preprocessing, SFH encoding with a transformer
https://github.com/astroinfo-hacks

## Education

2024 – 2026
**Master of Science in Data Science and Artificial Intelligence**
**University of Tours**
*Data Quality and Preparation*
*Machine Learning and Deep Learning Techniques*
*Strong Foundations in Statistics and Probability*
*Experience with Data Warehousing and Advanced Data Structures*

2022 – 2024
**BUT3 Software Engineering Bachelor's**
**Orléans University - Institute of Technology** Software Engineering
*Project management and software developement*
*Consistent and strong learning of many languages and technologies*
*AI orientation*

2020 – 2022
**Computer Science's x Physics Degree - Polytechnique Montreal**
*Software engineering and software developement*
*Physics, Linear algebra and Calculus*
*Python/MatLab Simulation*
*Functional app with Qt - Team work and project management*

2017 – 2020
**Hight School graduation** A+ grade
French diplomas "BAC S SI"
Options : *Engineering Sciences , English*.

## Skills

Langages
English : fluent - French : native

Programmation
Python (numpy, pandas, keras, pytorch, JAX …) , C/C++ (OpenGL/Qt), Java, PHP, LaTeX, …

Databases
PostgresSQL, MySQL, SQLite, SUPABASE, NoSQL (MongoDB), Neo4j Cypher, SparQL - SHACL.

Web
HTML, CSS, JavaScript (Vue, React, Svelte).

## Miscellaneous

### Interests

- **Sports**: 7 years of cycling
- **Research**: Strong interest in academic research

## Miscellaneous (continued)

### Others

2024 – 2026 **Tours University** Student representative

2023 – 2024 **Orléans University Institute of Technology** Student representative - elected to the Board of Directors

**Travel**: Lived 2 years in Canada

**License**: Driver's license (+4 years) and owns a car

## References

**Marc Huertas-Company :** marc.huertas.company@gmail.com **Claire Revillet :** claire.revillet@cnrs-orleans.fr