JORIS PARET

MACHINE LEARNING SCIENTIST
&
COMPUTATIONAL PHYSICIST

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joris-paret

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SKILLS

Scientific Research
Physics & Simulation
Machine Learning & AI
Large Language Models (LLM)
Python Programming
Software Development
High Performance Computing
Data Analysis

EDUCATION

PHD IN COMPUTATIONAL PHYSICS
University of Montpellier, France
2021

MASTER IN COMPUTATIONAL PHYSICS
University of Montpellier, France
2018

BACHELOR IN THEORETICAL PHYSICS
University of Montpellier, France
2016

PROFILE

Machine learning scientist and computational physicist with strong programming expertise in Python and experience working in international, multidisciplinary environments. Currently applying ML to model calibration and anomaly detection at ITER Organization, with a solid foundation in scientific research, algorithm development, and open-source software. Passionate about solving complex technical challenges in nuclear fusion and R&D settings.

PROFESSIONAL EXPERIENCE

POSTDOCTORAL MACHINE LEARNING SCIENTIST

ITER Organization, Saint-Paul-lez-Durance (FR) | Feb 2023 – Present

Contributed to ITER, the world's largest international scientific collaboration, aiming to demonstrate the feasibility of large-scale clean energy from nuclear fusion. Designed a machine-learning-based calibration strategy for ANSYS finite-element models using Bayesian optimization and Gaussian processes. Developed anomaly detection algorithms for predictive maintenance, enabling intershot and real-time monitoring. Contributed to the Tokamak Systems Monitor software, including version control and data handling (Git, DVC). Administered the team's multi-GPU compute server. Presented results at international conferences (SOFT, SOFE) and workshops (Fusion for Energy AI Workshop). Explored LLMs for automated tokamak operation reporting. Co-supervised interns and supported external contributors.

DOCTORAL RESEARCHER

Laboratoire Charles Coulomb, Montpellier (FR) | Oct 2018 – Nov 2021

Research on the emergence of local order in disordered materials such as glasses and supercooled liquids using molecular dynamics simulations, unsupervised machine learning (clustering, dimensionality reduction, autoencoders), and information theory. Developed a fully documented open-source Python package (*partycls*) for machine-learning-based structural analysis, with CI/CD integration. Ran large-scale simulations on CPU and GPU clusters. Presented work at international conferences and workshops. Delivered 200+ hours of undergraduate teaching in physics and programming.

RESEARCH ASSISTANT

Université de Montréal, Montréal (CA) | Feb 2018 – Aug 2018

Performed quantum simulations to study the electronic and vibrational properties of complex 2D materials. Hands-on experience with large-scale simulations on HPC clusters. Attended international summer schools on parallel computing (MPI, OpenMP, CUDA) and quantum physics for materials science.

RESEARCH ASSISTANT

Laboratoire Charles Coulomb, Montpellier (FR) | May 2017 – Jul 2017

Performed Raman scattering and reflectometry experiments on graphene samples using complex experimental setups. Contributed to the development of a LabVIEW application for automating measurements and used Python for data analysis.

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LANGUAGES

French – *Native*
English – *Bilingual*
Spanish – *Fluent*
Italian – *Beginner*
Greek – Beginner

CERTIFICATIONS

LANGCHAIN FOR LLM APPLICATION DEVELOPMENT
DeepLearning.AI (2025)

NATURAL LANGUAGE PROCESSING IN TENSORFLOW
DeepLearning.AI (2023)

SEQUENCE, TIME SERIES AND PREDICTIONS
DeepLearning.AI (2023)

ITERATIVE TOOLS FOR DATA SCIENTISTS & ANALYSTS
Iterative (2023)

BUILDING DEEP LEARNING MODELS WITH TENSORFLOW
IBM (2022)

DEEP NEURAL NETWORKS WITH PYTORCH
IBM (2022)

DEEP LEARNING & NEURAL NETWORKS WITH KERAS
IBM (2022)

MACHINE LEARNING WITH PYTHON
IBM (2022)

C++ PROGRAMMING – FROM BEGINNER TO BEYOND
Udemy (2021)

PROFESSIONAL EXPERIENCE continued

RESEARCH ASSISTANT
Laboratoire Charles Coulomb, Montpellier (FR) | Jun 2016

Fabricated complex heterostructures through mechanical exfoliation and stacking of 2D materials. Characterized materials using Raman spectroscopy and white-light reflectometry. Authored a microscope user manual for training graduate students in optical characterization.

RESEARCH ASSISTANT
Laboratoire Charles Coulomb, Montpellier (FR) | Jun 2015

Developed Python models and ran simulations to study how opinions propagate on small-world networks. Explored consensus dynamics and decision-making processes by systematically varying model parameters and assumptions. Conducted extensive data analysis to evaluate behavioral patterns and outcomes across different scenarios.

PUBLICATIONS

"Machine learning-based anomaly detection for ITER's Tokamak Systems Monitor: a gyrotron case study"
J. Paret, D. Iglesias, D. Sabio Ruiz, D. Meloni, A. Antonione, R. Bertazzoni, G. Carannante, M. Ferrari, M. Ortiz de Zúñiga, M. Cavinato, F. Sánchez Arcos, A. Portone
IEEE Transactions on Plasma Science, 2025 (under review)

"Preliminary machine learning-based calibration strategy for the ITER Tokamak Systems Monitor"
J. Paret, D. Iglesias, H. Bak, M. Clough, G. Vayakis, M. Walsh
Fusion Engineering and Design, 2025 (under review)

"Dimensionality reduction of local structure in glassy binary mixtures"
D. Coslovich, R. L. Jack, J. Paret
The Journal of Chemical Physics, 2022

"Hidden order in disordered materials"
J. Paret
PhD thesis in HAL open archive, 2021

"partycls: A Python package for structural clustering"
J. Paret & D. Coslovich
The Journal of Open Source Software, 2021

"Assessing the structural heterogeneity of supercooled liquids through community inference"
J. Paret, D. Coslovich, R. L. Jack
The Journal of Chemical Physics, 2020

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HOBBIES

- Climbing, running, hiking
- Drums, ukulele, mandolin, saxophone, computer music
- Cooking
- Game development
- Logo design

OPEN-SOURCE PROJECTS

hamoco

Python package for real-time mouse control using hand gestures captured from a webcam. Built with a neural network trained on custom hand landmark dataset, it leverages MediaPipe for hand tracking and Keras for gesture classification. Designed for low-latency interaction and ease of use, the package enables intuitive, touchless control of a computer cursor. Available on PyPI for easy installation and cross-platform use.

Synth Road

Retro-style obstacle-avoidance game for Android set in a neon synthwave universe. Developed with the Unity game engine in C#. The game features progressively challenging levels and a minimalist visual style. The APK is freely available on GitHub, and any revenue generated from optional in-game ads is donated to non-governmental organizations.

partycls

Python package for unsupervised structural clustering in particle-based simulations. Provides a flexible framework to classify local environments using a variety of structural descriptors, combined with dimensionality reduction and clustering algorithms from scikit-learn. Designed for analyzing disordered materials such as glasses or colloids, it supports high-throughput workflows and reproducible analysis. Published in the *Journal of Open Source Software* and available on PyPI.