

Francesco Innocenti

Oxford, UK

🌐 Website: [francesco-innocenti](https://francesco-innocenti.github.io)
✉ francesco.innocenti@ndcn.ox.ac.uk

Experience

- Nov 2025 - present **Postdoctoral Researcher**, *University of Oxford*, UK.
○ Research at the intersection of Machine Learning and Computational Neuroscience.
- Oct 2023 - **Applied Scientist Intern**, *Amazon*, Barcelona.
- Apr 2024 ○ Helped improve and evaluate a short-term forecast of Amazon packages delivered throughout Europe, contributing to an internal conference paper and \$MM savings in operational costs.
- Jun-Aug 2020 **Research Intern**, *TIMING, AWARENESS, AND SUGGESTION LAB*.
○ Trained and tested machine learning classifiers to categorise the subjective experiences associated with different psychedelic drugs, based on psychometric data from 55 peer-reviewed studies.

Education

- Sept 2021 - 2025 **PhD, Machine Learning & Theoretical Neuroscience**, *University of Sussex*, UK.
○ Thesis: “Towards Scaling Deep Neural Networks with Predictive Coding: Theory and Practice”.
○ Teaching Assistant on Fundamentals of Machine Learning.
○ Developed [JPC](#) (★ 57), a JAX library for training neural networks with predictive coding.
○ Curated repositories of papers on [Neuro-AI](#) (★ 47) and [Hessian of neural networks](#) (★ 2).
- Sept 2018 - Jun 2021 **BSc, Psychology with Cognitive Neuroscience**, *Goldsmiths, University of London*.
○ 1st Class Honours.†
○ Thesis: “Modelling the Evolution of Visual Perception with Evolutionary Algorithms”.

Skills

- Coding Python (highly experienced), git (highly experienced), Docker (basic) CI/CD (experienced), SQL (experienced), AWS (experienced), SLURM (basic), \LaTeX (highly experienced).
- Autodiff. PyTorch (highly experienced), JAX (highly experienced).
- Web dev. HTML (basic), streamlit (experienced).
- Languages English (proficient), Italian (native), Spanish (fluent).

Selected papers

- [1] **Innocenti, F.**, and Achour, E. M. (2025). A Simple Generalisation of the Implicit Dynamics of In-Context Learning. *NeurIPS Workshop on What Can(t) Transformers Do?*.
- [2] **Innocenti, F.**, Achour, E. M., and Buckley, C. L. (2025). μ PC: Scaling Predictive Coding to 100+ Layer Networks. *Advances in Neural Information Processing Systems* 38.
- [3] **Innocenti, F.**, Achour, E. M., Singh, R., and Buckley, C. L. (2024). Only Strict Saddles in the Energy Landscape of Predictive Coding Networks? *Advances in Neural Information Processing Systems* 37.
- [4] ***Innocenti, F.**, Singh, R., and Buckley, C. L. (2023). Understanding Predictive Coding as a Second-Order Trust-Region Method. *ICML Workshop on Localized Learning*.

Awards

- *Best Paper Award at the ICML 2023 Workshop on Localized Learning.
- †British Psychological Society (BPS) Award for highest performance in undergraduate degree.