

# Francesco Innocenti

Theoretical Neuroscience PhD student

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## Education

- Sept 2021 - **PhD, Theoretical Neuroscience**, *University of Sussex*, UK.
- 2025
    - Working thesis: “Advancing the Theory and Practice of Predictive Coding Networks.”
    - Teaching Assistant on Fundamentals of Machine Learning
    - Developed **JPC**: a JAX library for training neural networks with predictive coding (★ 21)
    - Curated repositories of papers on **Neuro-AI** (★ 38) and **Hessian of neural networks**
  - Sept 2018 - **B.Sc. Psychology with Cognitive Neuroscience**, *Goldsmiths, University of London*.
  - Jun 2021
    - 1st Class Honours
    - Thesis: “Modelling the Evolution of Visual Perception with Evolutionary Algorithms” [[code](#)]

## Experience

- 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.
- Oct 2018 - **Research Assistant**, *ART LAB*.
- Jun 2021
  - Helped develop and validate a neuropsychological test of face recognition (see publications)
- 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

## Skills

- Coding Python (highly experienced), AWS (basic), SQL (experienced),  $\LaTeX$  (highly experienced), Julia (conversant), MATLAB (conversant), C# (basic)
- Autodiff JAX, PyTorch, TensorFlow
- Web dev. HTML (basic), streamlit (experienced)
- Languages English (proficient), Italian (native), Spanish (conversant)

## Papers

- [1] **Innocenti, F.**, Kinghorn, P., Yun-Farmbrough, W., Varona, M. D. L., Singh, R., Buckley, C. L. (2024). JPC: Flexible Inference for Predictive Coding Networks in JAX. *arXiv preprint arXiv:2412.03676*.
- [2] **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* 38.
- [3] **\*Innocenti, F.**, Singh, R., and Buckley, C. L. (2023). Understanding Predictive Coding as a Second-Order Trust-Region Method. *ICML Workshop on Localized Learning (LLW)*.

## Awards

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