Francesco Innocenti

Theoretical Neuroscience PhD student

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Education

Sept 2021 - 2025 **PhD, Theoretical Neuroscience**, *University of Sussex*, UK.
- Working thesis: "Scaling Predictive Coding Networks in Theory and Practice"
- Teaching Assistant on Fundamentals of Machine Learning
- Developed JPC : a JAX library for training neural networks with predictive coding (★ 35)
- Curated repositories of papers on Neuro-AI (★ 41) and Hessian of neural networks (★ 1)

Sept 2018 - Jun 2021 **B.Sc. Psychology with Cognitive Neuroscience**, *Goldsmiths, University of London.*
- 1st Class Honours†
- Thesis: "Modelling the Evolution of Visual Perception with Evolutionary Algorithms"[code]

Experience

Oct 2023 - Apr 2024 **Applied Scientist Intern**, *Amazon*, Barcelona.
- 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 - Jun 2021 **Research Assistant**, *ART LAB.*
- Helped develop and validate a neuropsychological test of face recognition.

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), Git (highly experienced), AWS (basic), SQL (experienced), LaTeX (highly experienced), Julia (conversant), MATLAB (conversant), C# (basic)

Autodiff PyTorch (highly experienced), JAX (highly experienced), TensorFlow (basic)

Web dev. HTML (basic), streamlit (experienced)

Languages English (proficient), Italian (native), Spanish (fluent)

Papers

[1] **Innocenti, F.**, Achour, E. M., and Buckley, C. L. (2025). μPC: Scaling Predictive Coding to 100+ Layer Networks. *arXiv preprint arXiv:2505.13124.*

[2] **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.*

[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 38.*

[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 (LLW).*

Awards

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