

# Laurence Freeman

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## SUMMARY

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An interdisciplinary candidate with experience in software engineering, neuroscience and product development. Currently undertaking a PhD in Computational Neuroscience with a focus on Machine Learning and designing software for brain computer interfaces (BCIs).

## RESEARCH EXPERIENCE

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**Sainsbury Wellcome Centre (SWC) - PhD Candidate** October 2021 - present

- **Neural Modeling:** Applying dynamical systems theory to neuronal populations
- **Closed looped BCIs:** Developing online neural signal processing techniques to detect and manipulate neural signals
- **Awake behavior recordings and training:** Recording from awake rodents during innate tasks for the collection of electrophysiological data using 385 channel devices
- **Rotations:** Building miniature microscopes and RL agents in unity

**CortexLab - University College London - Master's student** April 2020 - September 2021

- **Reinforcement learning:** Python and C++ implementation of Q-Learning algorithms to model two arm bandit tasks
- **General linear modeling:** Development of kernel regression models for neural disentanglement and an autoregressive model to track the influence of past behaviors
- **Computer vision:** Through the use of python, cloud computing (Amazon Web Services) and computer vision. I built a bespoke package on top of DeepLabCut, a machine learning library, to automatically classify task factors from behavioral videos

## INDUSTRY EXPERIENCE

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**Adthena - Group Product Manager** October 2017 - August 2021

- **Prototype development:** Working directly with software engineers, designers and data scientists to ensure ideas are first prototyped to mitigate any feasibility risks before full-scale delivery
- **End to end product lifecycle experience:** Led the creation of a geospatial product from concept to market delivery which currently generates \$500k a quarter in revenue
- **Interdisciplinary leadership:** Was the group leader of over 30+ software engineers, data scientists and designers with full management responsibilities for two employees
- **Teaching / Communication:** Trained the entire workforce in advancements of our data analytics platform for 100+ people across three geographical regions

**Accenture Technology - Consultant** November 2015 - October 2017

- **Cryptography:** I invented a cryptography product that generated \$4 million in revenue (US patent number 10742395) and was implemented at the Canadian stock exchange - [Reference](#)
- **Keynote Speaker:** I attended several international conferences and presented my research on distributed computing to over 250 people

## AWARDS

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- A product I lead at Adthena won the best search engine tool award - 2022 - [Reference](#)
- Wellcome Trust PhD scholarship (£150,000) - 2021
- Award from the Institute of Electrical and Electronics Engineers for brain computer interface developments — Austria - 2018
- Dragons' den entrepreneur winner (\$50,000) - 2017

## EDUCATION

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2021 - present	PhD (Computational Neuroscience) at <b>Univeristy College London</b>	
2023	Machine Learning Summer School <a href="#">Reference</a>	
2019 - 2021	MSc Neuroscience <b>Univeristy College London</b>	(Distinction)
2014 - 2015	MBA Masters in Buisness Administration <b>The university of Edinburgh</b>	(Merit)
2011 - 2014	BSc (Hons) Marine Biology and Animal Behaviour <b>Anglia</b>	(Distinction - Top of Class)

## PUBLICATIONS AND CONFERENCES

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Structured Credit Assignment in Mice — Kevin Miller\*, Laurence Freeman, Yu Jin Oh, Matthew Botvinick\*, Kenneth Harris — (Pre-print soon). \*Deepmind

This work was accepted at the following conferences:

- CCN: Conference on Cognitive Computational Neuroscience (2023)
- SFN: Society for Neuroscience (2022)

## SKILLS

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### Programming:

- 5+ years of python — 1 year of C++ and C for unreal and unity
- Codewars rank: 4 kyu

### Machine Learning:

- Latent Variable Models e.g Hidden Markov Models — Directed Acyclic Graphs — General Linear Models — DeepNets (RNN, CNN) — With implementations in both exact and approximate inference for unsupervised approaches

## VOLUNTEERTING

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- For the last five years I've lead scouting activities for a troop belonging to Great Ormond Street Children's hospital in London
- From 2017-2018 I was a pro-bono design counsultant working with the NHS (National Health Service), a large cancer charity and other institutions to help improve their digital experience for their customers

## INTERNSHIPS

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- Deloitte Consulting SVS (Summer Vacation Scheme) (2014)