Sophie **Martin**

PhD Student · University College London

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Research Interests

I am a PhD student on the i4Health CDT at University College London interested in applications of artificial intelligence (AI) to healthcare. My PhD focuses on the use of interpretable deep learning in medical imaging to bridge the gap between research and clinical practice. Outside of my own work, I'm also interested in and excited by physics-inspired neural networks and methods that improve robustness and generalisability.

Education

University College London — *London*

PhD in AI & Medical Imaging (1+3, ESPRC-funded) — *2020 - Present*

Imperial College London — *London*

MSci Physics — *2016 - 2020*

St Angela's Ursuline School — *London*

A Level: 3A*'s (Maths, Further Maths, Physics) & 1A (History) — *2014 - 2016*

GCSE: 9A*s (including Maths and English Language) & 2As + FMSQ — *2009 - 2014*

Research Projects

Evaluating Explanation Methods in Deep Learning for Stroke Classification — *University College London*

MRes Research Project — *Oct 2020 - May 2021*

- I evaluated popular explanation methods for a convolutional neural network trained to classify stroke patients from healthy controls to assess their ability to identify biologically relevant regions of interest. Supervised by Professor James Cole and Professor Frederik Barkhof.

A Network Science Perspective on Signal Propagation in the Brain — *Imperial College London*

MSci Research Project — *Oct 2019 - May 2020*

- I developed a cellular graph network to model excitation spread across structures such as small-world, stochastic model and a Barabasi-Albert hub network. This involved graph theory and criticality analysis. Supervised by Professor Kim Christensen.

Sensitivity Studies of the 5 MeV Distortion at SoLid Utilising Machine Learning — *Imperial College London*

BSc Research Project — *Oct 2018 - May 2019*

- I evaluated the use machine learning to detect a distortion in the anti-electron neutrino energy spectrum. This signal vs. background problem is highly transferable and was a useful application of statistical data analysis. Supervised by Dr Daniel Saunders.

Industry Experience

Illumina — *Cambridge*

Bioinformatician, Internship — *Jul 2019 - Oct 2019*

- I built a pipeline that used machine learning to identify tumour-only variants from genetic data in Python.
- I used feature visualisation, engineering and hyperparameter tuning to improve performance.
- I used the Sun Grid Engine cluster computing framework to submit jobs for batch processing.

Open Energi — *London*

Data Scientist, Internship — *Jul 2018 - Sep 2018*

- I contributed to a project to improve asset performance for rapid grid-frequency response.
- Code was developed in Python, Git was used to collaborate with other developers and SQL was required to interact with the database.

Jaguar Land Rover — *London*

Weight Engineer, Internship — *Jul 2018 - Sep 2018*

- I created a tool to quantify the effect of changes to vehicle weight to other attributes.

Teaching Experience

AI in Biomedicine & Healthcare

University College London

Postgraduate Teaching Assistant, Department of Computer Science — *September 2022 - Present*

- This course focuses on current ML and AI trends and their application to healthcare and the need for domain-specific knowledge when processing healthcare data.

Introduction to Deep Learning

University College London

Postgraduate Teaching Assistant, Department of Computer Science — *Oct 2021 - Jan 2022*

- This course covers the fundamentals of deep learning, with a focus on several applications: image/test classification, segmentation and different architectures: CNNs, VAEs, RNNs and GANs. I assisted with teaching and marking and delivered a guest lecture on Model Interpretation.

Publications & Awards

Publications

*	**Journal Paper**, **Sophie A. Martin**, Florence J. Townend, Frederik Barkhof, James H. Cole, *Interpretable deep learning for dementia: a systematic review.*	*In-Preparation*
2021	**Conference Paper**, Liam F. Chalcroft, Jiongqi Qu, **Sophie A. Martin** et al. , *Development and evaluation of intraoperative ultrasound segmentation with negative image frames and multiple observer labels.* `https://doi.org/10.1007/978-3-030-87583-1_3`	*ASMUS*

Awards

2022	**1st Prize**, PhD Student EDI Student Award	*University College London*
2022	**2nd Place**, NeuroHACK Hackathon, DEMON Network	*Virtual Event*
2021	**Finalist**, 15th Annual London Hopper Colloquium	*Virtual Event*
2016	**Winner**, Worshipful Company of Coachmakers and Coach Harness Makers' Jaguar Land Rover Bursary	*London*

Academic Activities

Present	**Organiser**, Joint DRC-CMIC Weekly Journal Club & Workshop	*University College London*
Present	**Committee Member**, Computer Science EDI Working Group	*University College London*
2022	**Reviewer**, Journal Paper	*NeuroImage*

Other Activities

The Blackett Lab Family C.I.C

London

Director of Media & Marketing — *Jun 2020 - Present*

- I create social media content, marketing materials and lead website development and maintenance.

Project Partners Education CIO

London

Board Trustee — *Mar 2020 - Present*

- I help to facilitate the growth of the charity by consulting on teaching materials and content.

Google GetAhead Program

Virtual Event

Participant — *Jul 2021 - Sep 2021*

- I participated in a 6-week virtual program for selected CS students across EMEA. The program involved technical challenges, YouTube live trainings and interview workshops.

Skills

Programming	Python, TensorFlow, Pytorch, MatLab, Bash, SGE Computing, SQL, Git, LaTeX
Web	HTML5, CSS, Bootstrap 4, Javascript
General	UK Driving License, English (Native), French (B1)