

# Edward Phillips

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I am a DPhil candidate in Engineering Science at the University of Oxford, researching AI for Healthcare in the Computational Health Informatics Lab. I previously spent three years in industry as a data scientist and systems engineer, working in generative AI, medical device development, and biomarker research. I hold a Master's Degree in Information and Computer Engineering from the University of Cambridge, achieving First Class with Distinction. I have 10+ years of Python experience, with expertise in deep learning across language, images and other modalities. I have been described by others as a high performer with the ability to build effective relationships across disciplines.

## University Education

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### University of Oxford, Computational Health Informatics Lab

Oxford, UK

*DPhil, Engineering Science, supervised by Professor David Clifton*

*October 2024 - Present*

- The aims of the lab are to make fundamental contributions to the theory of AI in medicine while also working with collaborators to produce systems that help patients.
- My research is centered around the development of AI tools to support clinical decision-making, with an emphasis on explainable and uncertainty-propagating methods.
- In the language domain, I have published methods to quantify uncertainty in large language models, with applications in hallucination detection. I have also created an agent-based framework for treatment planning in oncology, with an upcoming pilot evaluation in collaboration with NHS and industry partners. Further information can be found at [www.oncology.ox.ac.uk/research/projects-and-collaborations/trustedmdt](http://www.oncology.ox.ac.uk/research/projects-and-collaborations/trustedmdt)
- I am currently developing novel foundation models for electronic health record data, which I aim to employ for actionable risk prediction in primary care settings.

### University of Cambridge

Cambridge, UK

*MEng Information and Computer Engineering*

*September 2016 - June 2020*

- I achieved a First in every year of examinations, and was awarded a senior scholarship each year for academic achievement. In my second year I was awarded the Bill Ray Prize for special aptitude in electrical subjects.
- I was awarded a distinction for my Master's project in computational neuroscience, in which I used TensorFlow to train biologically-interpretable models which could replicate the input-output mapping of real neurons.
- I specialised in Information and Computer Engineering. Particular areas of focus were deep learning, statistical signal analysis, and mathematical methods. The specific modules I studied included software design, deep learning, computer vision, advanced control theory, medical imaging, molecular biology, and neuroscience.
- As well as my specialist areas, I studied a wide range of disciplines including mechanics, structures, fluid dynamics, electronics, electrical engineering, mathematics, economics and risk modelling.

## Publications

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### Semantic Self-Distillation for Language Model Uncertainty

E. Phillips, S. Wu, B. Gao, D. Clifton. [arxiv.org/abs/2602.04577](https://arxiv.org/abs/2602.04577)

### Geometric Uncertainty for Detecting and Correcting Hallucinations in LLMs

E. Phillips, S. Wu, S. Molaei, D. Belgrave, A. Thakur, D. Clifton. [arxiv.org/abs/2509.13813](https://arxiv.org/abs/2509.13813)

### Foundation Models for Biosignals: A Survey

X. Gu, Y. Shu, J. Han, Y. Liu, Z. Liu, J. Anibal, V. Sangha, **E. Phillips**, B. Segal, Y. Liu, H. Yuan, F. Liu, K. Branson, P. Schwab, D. Belgrave, L. Clifton, D. Spathis, V. Lampos, A. A. Faisal, D. A. Clifton. [techrxiv.org/doi/full/10.36227/techrxiv.175606236.62808131](https://techrxiv.org/doi/full/10.36227/techrxiv.175606236.62808131)

## Skills

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**Programming Languages/Tools:** Python, SQL, AWS, Azure, Git

**Libraries:** PyTorch, TensorFlow, Transformers, Numpy, pandas, scikit-learn

**Languages:** English (native), French (intermediate), Spanish (intermediate)

## Employment History

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### Norstella - pharmaceutical solutions

London, UK

*Data Scientist*

*November 2023 - September 2024*

- I developed generative AI applications for customers across the pharmaceutical industry, including a retrieval-augmented generation framework to facilitate interrogation of Norstella's forecasting and market analysis datasets.
- The framework used state-of-the-art developments in query-rewriting, knowledge retrieval, and prompting techniques to deliver relevant and reliable information to users. I applied widely accepted LLM evaluation metrics to monitor the performance of the applications using popular frameworks such as Langchain.
- I used the suite of tools in the AWS ecosystem to develop, deploy and manage data science services. I am familiar with AWS cloud services, REST/Websocket APIs, Docker and terraform, among other tools.
- I integrated new predictive models into Norstella's suite of financial forecasting products, using interpretable machine learning approaches and deployment and management tools such as Apache Airflow and Kubernetes.

### Owlstone Medical - medtech scale-up developing a breathalyzer for disease

Cambridge, UK

*Data Scientist*

*June 2022 - April 2023*

- I worked across multiple projects applying machine learning and data science to support R&D.
- I trained time-series regression models to predict concentrations of on-breath gases using sensor data, enabling diagnosis of digestive diseases via a handheld device.
- I created a cost-efficient digital pathology pipeline to quantify protein expression in high-resolution tissue images, delivering same-day results at less than 20% of the cost of commercial alternatives. The pipeline identified promising candidate biomarkers relating to early identification of cancers.
- I applied transformer-based protein foundation models and graph neural networks to predict enzyme-substrate affinities, which accelerated selection of suitable compounds for use in Owlstone's diagnostics platform.

### Owlstone Medical

Cambridge, UK

*Systems Engineer*

*April 2021 - June 2022*

- I led the engineering work to design, develop, and test a mouse breath sampling device for use in biomarker discovery. I wrote a Python-based GUI for user interaction, I developed a dynamic control system to regulate air flows, and managed a multi-device electronics configuration.
- I delivered a prototype system on-time for use in an animal study, which was used to derisk the company's flagship method for breath-based detection of lung cancer.

### Organox - organ preservation for transplantation

Oxford, UK

*Engineering Intern*

*July - August 2018*

- I conducted a research project to tackle challenges in scaling down the company's organ-preserving perfusion device to work for small organs such as kidneys. I developed a test circuit and wrote control firmware in C to deliver controlled oxygen flow rates in an energy-efficient manner.
- Using a form of oxygen storage I was able to achieve an 85% reduction in energy consumption, and demonstrated how further savings could be achieved. Organox continued to develop a kidney perfusion device with a successful human clinical trial completed in 2024.

### Livingbridge Private Equity

London, UK

*Junior Analyst*

*July - September 2017*

- I created relational databases for sensitive company data, and wrote SQL and Excel VBA for analytics tasks.

## Teaching

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### University of Oxford, Engineering Science Undergraduate Tutorials

Oxford, UK

*Machine Learning, Software Engineering*

*2025 - Present*

- I teach two courses to third-year Engineering Science undergraduates. The machine learning course covers topics including graphical models, approximate inference, and neural networks. The software engineering course covers C++ design principles and algorithmic development.

### University of Oxford, Lectures and Labs

Oxford, UK

*Centre for Doctoral Training in Healthcare Data Science, MSc Applied Digital Health*

*2024 - Present*

- Together with colleagues from my research lab, I teach modules in CDT and MSc courses covering Python, Machine Learning, and Artificial Intelligence, with a focus on healthcare applications.