Charles Harris

07792 541377 | cch57@cam.ac.uk | GitHub | Website | LinkedIn | British Citizen

EDUCATION

University of Cambridge Oct. 2021 – Present
PhD in Computer Science and Technology Cambridge, UK

- **Supervisors**: Prof Pietro Liò, Prof Sir Tom Blundell FRS,
- **Funding**: Cambridge Centre for AI in Medicine (CCAIM) Studentship, sponsored by AstraZeneca and GSK

Imperial College London Oct. 2020 – Sept. 2021
*MSc in Bioinformatics and Theoretical Systems Biology - **Distinction*** London, UK

- **Supervisors**: Prof Michael Bronstein (Imperial, Twitter), Prof Bruno Correia (EPFL)

Imperial College London Oct. 2017 – Sept. 2020
BSc in Biochemistry - 2:1 London, UK

SELECTED PROJECTS

MSc Project 3 - Distinction Supervisors: Prof Michael Bronstein, Prof Bruno Correia
Geometric Deep Learning for structure-based drug design Jun. 2021 – Sept. 2021

- Developed a molecular graph generation procedure which improves previous work by conditioning multiple stages of the generative procedure with an attention mechanism between the molecule and protein pocket (using dMaSIF)

MSc Project 2 - Distinction Supervisors: Michael Bronstein, Bruno Correia
Learning interpretable protein dynamics using Geometric Deep Learning Apr. 2021 – Jun. 2021

- Created a novel message-passing layer for protein graphs that learns interpretable protein dynamics

MSc Project 1 - Distinction Supervisor: Prof Michael Sternberg
Prediction of the effect of missense variants involved in ligand binding via docking Jan. 2021 – April. 2021

Graphein - Open Source Contributor - Preprint
Graphein aims to democratise access to protein graph data for geometric deep learning models

PREPRINTS

Graphein - a Python Library for Geometric Deep Learning and Network Analysis on Protein Structures and Interaction Networks. A. R. Jamasb, R. Viñas Torné, E. J. Ma, **C. Harris**, K. Huang, D. Hall, P. Lió, T. L. Blundell., preprint

TECHNICAL SKILLS

Python: PyTorch, PyTorch Geometric, Deep Graph Library/DGL-LifeSci, NetworkX, Tensorflow/Keras , some experience with Sonnet and JAX/Jraph
Computing: Linux, SQL, GPU machines, familiar with use of computing clusters
Statistics: Proficient in R, Probability, Likelihood statistics, Bayesian statistics, Linear regression, Classification
Structural Biology: Deep understanding of protein structure. Highly proficient in PyMol. Highly experienced in structure prediction (AlphaFold2, Phyre2) Experience with building atomic models in Coot and NMR analysis in CCPNmr
Chemoinformatics/drug design: RDKit, Conventional docking (AutoDock, SWISSDOCK)
Biochemistry and molecular biology: Strong background in and understanding of common lab data collect techniques
Bioinformatics: Genome assembly and annotation, RNA-seq data analysis, Sequence alignment, Protein function and structure prediction, NGS data analysis in R and Artemis
Systems biology/MatLab: ODEs, Master equations, Gillispie simulations, Dynamical systems (linear stability analysis, bistability, phase portraits), Quantitative cell imaging

SCIENCE COMMUNICATION

Chair and Founder - 1st Imperial AI in Drug Discovery Conference
Chaired multiple talks and discussion panels from scientific and business leaders - see handbook Feb. 2021

Guest - iGEM Synthetic Biology Podcast Link
Discussed AlphaFold2, my research and the impact of computation and AI on biology in general Aug. 2021

VOLUNTEERING

Advisor
Imperial College International Directed Evolution Competition (iDEC) Team Jun. 2021 – Oct. 2021

- Advised the team on how to leverage different protein structure prediction tools for their project (including the use of AlphaFold2)

Chair and Founder
Imperial College Computational Biology Society Oct. 2019 – Aug. 2021

- Created and chaired Imperial's first **AI in Drug Discovery Conference** with top scientists, business leaders and entrepreneurs, over 1,400 tickets sold
- Moderated two panel discussions as part of conference (first one with 4 CEOs/Founders of AI in Drug Discovery companies and second with Prof Sir Tom Blundell, Prof Michael Bronstein and Dr Andreas Bender)
- Organised regular webinar schedule with top companies and academics in computational biology (including BenevolentAI/Dr Nathan Brown, DeepMind (Dr Petar Velikovi) Nvidia, LabGenius, Imperial and UCL)
- Organised six workshops to teach biologist computational and coding skills
- Quickly grew the Society to over 340 members and developed a strong social media presence
- Showed strong leadership, organisational and team building skills by creating an effective team and culture from scratch. Managed 20 volunteers and numerous projects in the first term

Ambassador
Helen Arkell Dyslexia Charity Oct. 2019 – Present

Secretary
Imperial College Amnesty International Society Oct. 2019 – Aug. 2020

REFERENCES - all are past and present supervisors

Prof Sir Tom Blundell FRS - University of Cambridge tom@cryst.bioc.cam.ac.uk
Professor Emeritus of Biochemistry, Former President - BBSRC, Biochemical Society

Prof Peitro Lio - University of Cambridge pl219@cam.ac.uk
Professor of Computational Biology. Member - Artificial Intelligence Group and CCAIM

Prof Michael Bronstein - Imperial College London, Twitter m.bronstein@imperial.ac.uk
Chair of Machine Learning at Imperial, Head of Graph Learning Research at Twitter

Prof Michael Sternberg FRSB - Imperial College London m.sternberg@imperial.ac.uk
Director - Centre for Integrative Systems Biology and Bioinformatics

Prof Bruno Correia - EPFL bruno.correia@epfl.ch
Head - Laboratory of Protein Design and Immunoengineering

OTHER SKILLS

Awards: Gold - International Chemistry Olympiad 2017 UK Round 1, David Lean Scholar and Prefect - Leighton Park
Languages: Mandarin (A at GCSE Level)
Interests: Glider pilot, Hockey, Running, Drone photography, Science communication