Avish Vijayaraghavan

Translatable Machine Learning for Precision Medicine

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Education

Imperial College London — London, England
PhD Candidate in AI for Healthcare, supervised by Joram M. Posma and Philip Molyneaux — Oct 2021 - Present

- Working on multimodal, interpretable learning for idiopathic pulmonary fibrosis.
- Part of the third cohort for the AI4Health CDT programme. Funded by UKRI and AstraZeneca.

University College London — London, England
MSc in Precision Medicine (Distinction, ranked 1st) — Sept 2020 - Sept 2021

- Main courses: Bioinformatics & Structural Biology, Genetics & Epigenetics of Disease, Multiomics & Ethics, Precision Diagnosis for Precision Medicine, Computational Biology, Nanomedicines.

Imperial College London — London, England
BEng in Mathematics and Computer Science (First Class Honours in final year) — Sept 2017 - July 2020

- Main courses: Mathematical Biology, Applied Probability, Statistical Learning, Machine Learning, Computer Vision, Graphics, Robotics, Graphs and Algorithms.

Work Experience

Science Communicator — Apr 2022 - Present
Translatable Machine Learning for Precision Medicine — Portfolio on my website

- Created two YouTube videos on the geometry of gene expression dynamics and on increasing diversity in genomic studies.
- Blog post on the future of interpretability for scientific discovery.

University Tutor — Arts & Business College of London
Maths & Artificial Intelligence — Jan 2022 - Present

- Tutoring A-Level and university students in maths & artificial intelligence.
- Helped set up and deliver online data analytics course to foreign students.

Undergraduate Research Intern — Imperial Branch of St Mary's Hospital
Spatial Statistics, supervised by Samir Bhatt — July - Sept 2019

- Contributed to short project that aimed to improve the predictive accuracy of a machine learning method using a technique from differential geometry.

Projects

Structurally Integrating Biomedical Knowledge Into Proteomics Models — Mar 2022 - Present
PhD Project 1, supervised by Joram M. Posma

- Created protein co-occurrence graph from literature using a large biomedical language model called BERN2.
- Used protein co-occurrence graph to modify structure of neural network for biological interpretability without limiting performance.

3D Graph Representation Learning for Transition State Generation — Jan - Sept 2021
MSc Thesis, supervised by Brooks Paige — Code

- Created encoder-decoder model to generate transition states for unimolecular reactions in order to better characterise molecular synthesis routes.
- Performed similarly to state-of-the-art model in literature on performance and uncertainty calibration.

Data Science for DLBCL Stratification — Nov 2019 - Aug 2020
BEng Thesis, supervised by Elsa Angelini — Code

- Worked with biologists to split DLBCL cancer patients into more precise subgroups using machine learning.
- Presentation featured on Department of Computing's YouTube channel.

Skills & Interests

- **Programming Languages**: familiar with Python, Java, R; exposed to SQL, C, Solidity.
- **Technologies**: familiar with PyTorch, Git, Linux/Unix, LaTeX; exposed to CI/CD (GitLab, AWS), TensorFlow.

- **Extracurricular**: Imperial College Computing Football Team Captain '19/20, Imperial College Hip Hop Society Founder & Web Secretary '19/20, Music Journalism (originally published in Imperial's Newspaper), Imperial College DJ & Production Society '21/22, Screenwriting (our dark comedy feature length, "A Small Flame", is currently in submission to South Asian film festivals).
- **Languages**: English (Native), Russian (Basic), Spanish (Basic).

Teaching Service

BSc Biomedical Sciences — Imperial College London
Graduate Teaching Assistant — May 2022

- Helped develop Python notebook tutorials alongside other GTAs.
- Assisted main course lead in computational tutorials.

MSc Biomedical Data Science — Imperial College London
Graduate Teaching Assistant — Nov 2021

- Assisted main course lead in computational statistics tutorials.

Achievements

Dean's List for Division of Medicine — University College London - London, UK
Highest performing student on MSc Precision Medicine '20/21. — Sep 2021

hatch Hack 2018 Winners — Ministry of Justice - London, UK
Business model for app targeting postpartum depression in North India. — Nov 2018

B1 Proficiency Russian — Liden & Denz School - Moscow, Russia
Referring to the TKRI levels, progressed from A2+ to B1. — June 2018

Arabic Level 1 Course — Imperial Horizons - London, UK
Extra module taken in my BEng first year. — Nov 2017 - May 2018

Future Problem Solving Program — UK, USA
Won national program four years running; highest placed European team in international program. — 2014-2017