

Max Taylor-Davies

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Education

Imperial College London

2017-2021 MEng [Molecular Bioengineering](#) (first class)

Marks

- Year 1: 75.3%
- Year 2: 70.0%
- Year 3: 72.6%
- Year 4: 71.84%

Projects

- **MEng project:** developed a GPU-accelerated python toolkit for estimating receptive fields in the visual system based on a novel information-theoretic algorithm. Demonstrated the superiority of the toolkit to established methods on a suite of simple model visual neurons.
- **3rd year group research project:** investigated the potential of generative models to produce synthetic training data for an eczema severity classifier app. Tested and compared multiple flavours of GANs and VAEs, and finally set up an augmentation pipeline using StyleGAN 2.
- **2nd year (group) Engineering Design Project:** designed and fabricated a microfluidic "lab-on-chip" platform for predicting and monitoring drug resistance in breast cancer patients from a few drops of blood, for the purpose of optimising treatment strategies without need for invasive biopsy.

Relevant classes

- Mathematics I and II: provided a strong foundation in linear algebra, vector calculus, ordinary and partial differential equations, Fourier and Laplace transforms
- Advanced Signal Processing (EEE department): stochastic signals and their statistical description, parametric + nonparametric modelling of stochastic signals, optimal estimators and their performance bounds, adaptive estimation for nonstationary data
- Optimisation (EEE department): mathematical foundations of optimisation theory, derivations of common unconstrained and constrained optimisation algorithms, convergence theorems
- Reinforcement Learning (Computing department): Markov decision processes, temporal difference learning, Monte Carlo learning, tabular RL, deep RL (deep Q networks, proximal policy optimisation, actor-critic), policy gradients, online/offline learning

Professional experience

PolyAI

- October 2020 - June 2021 **Software engineer (platform team, part-time)**: worked on monitoring and profiling systems, as well as simplifying the process of creating and deploying new domain-specific natural language agents via a graphical low-code application.
- June 2020 - September 2020 **Software engineering intern**: designed and built a web application to provide insight into the activity, reasoning and performance of multiple deployed conversational AI agents in real-time. Used Golang, React (Typescript), Kubernetes.

Imperial College Business School

- October 2019 - June 2020 **Research assistant (part-time)**: wrote python scripts to scrape large amounts of blockchain data for later analysis as part of a research project on activity and planning in decentralised financial systems. Set up automation infrastructure so that data collection could continue after I left the role.

MedEngine GmbH

- June 2019 - October 2019 **Software engineer**: designed and built a web platform that enabled MedEngine data scientists to easily search, review and label raw motion and video data collected during hospital trials. This involved developing in-house video streaming and data visualisation tools in Go and React/Typescript.
- October 2018 - June 2019 **Research engineer (part-time)**: worked on design and implementation of new models and techniques for classifying tremor severity in Parkinson's disease patients based on raw motion data from the iPhone's builtin sensors.
- June 2018 - September 2018 **Software engineering intern**: worked on a cross-platform mobile app for Parkinson's disease care (using React native). Met with Parkinson's disease patients to understand their needs, and then implemented features such as mood tracking, diary with voice input, medication scheduler. Also experimented with using NLP techniques to model emotion + mood from free-text patient diary entries.

Other

Hackathons

ICHack18

My first hackathon: we used Python and various AWS services to build a speech-based narrative adventure game for the Amazon Echo platform, inspired by text-based classics like Zork and Adventure.

HackCity18

We built a chatbot for Starling Bank, equipped with some basic NLP (thanks to DialogFlow) that customers could use to get rapid analytics and easily perform basic account functions such as money transfer

Imperial HealthHack18 (won sponsor prize)

We used Swift to build a tamagotchi-like iOS game to teach children afflicted with diabetes about managing their blood sugar in a friendly, engaging way.