Oliver Cassidy

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EDUCATION

Imperial College London — London, UK
Masters of Engineering — Expected May 2027
MEng in Electronic and Information Engineering
Predicted First-Class Honours; Dean's List 2023-2024; Ranked in the top 10 (5%) of the year

The Manchester Grammar School — Manchester, UK
A Levels — Sep 2021 – Jun 2023
Mathematics A*, Further Mathematics A*, Physics A*, Electronics A*
Winner of the Paton Electronics Prize

iGCSEs — Sep 2019 – Jun 2021
Mathematics 9, Physics 9, Electronics 9, English Language 9, English Literature 8, Chemistry 9, Biology 9, Spanish 8, History 9, Geography 9

WORK EXPERIENCE

Imperial College London Undergraduate Research Opportunity — London, UK
Ultra-low Latency ML FPGA Research — Jun 2024 – Aug 2024

- I drafted a paper on reducing the lookup table (LUT) utilisation of LUT based NN models
- I wrote code to implement 'don't care' conditions within the CompressedLUT framework
- I used Python to automate and optimise the application of ompressedLUT to LUT based NN's, after evaluating the usage of the method with non-linear functions, yielding a large reduction in LUT usage and simplifying the compression process
- I used C++ to implement don't care conditions in NN models in LUTs during the synthesis process and write Verilog, Python to automate this process and I experimented with the effects of the rarity condition when selecting don't cares
- I adapted the train and test processes of PolyLUT and NeuraLUT to generate new outputs, and accept new inputs allowing for further reductions in LUT usage

Private 1:1 Tutoring — Jan 2021-Present

- I used social media to market my own tutoring business and attract clients, leading to a full client roster and a waitlist
- I have tutored over fifteen students at GCSE and A level in preparation for their examinations, leading to an increase in grades

Adelphi Automation — Stockport, UK
Robotics Placement — Jun 2022

- I learnt CAD to design parts to enable a suction cup and pump to be attached to a robotic arm
- I manufactured the parts by hand to match the designs, and fitted them to the robotic arm
- I successfully programmed the arm to automate the transfer of materials, leading to a 15x increase in the speed of the transfer

ACADEMIC PROJECTS

Collabify — Mar 2024 – Present

- I created a website which helped bring people together over music by introducing more collaboration to Spotify
- I used ML models in Python to suggest new music specific to a user's music taste, and the Spotify API to access the users taste
- I used web scraping techniques and ML to suggest concert recommendations based on multiple users data
- I initialised a database using SQL to store account details and the users' liked songs for a shared liked songs playlist
- I implemented a frontend web design with animations using HTML, CSS and JavaScript

Network Intrusion Detection System — Jul 2024

- I created and trained a NN model in PyTorch based on the CIC-IDC2017 dataset which contains data for 15 types of attack
- I created a packet sniffer in C to understand the method, and then implemented the packet sniffer with the model in Python
- I applied logs to record all packets, their classification given by the model and other relevant information

Lego Minifigure Design — Jul 2024-Present

- I used HTML, CSS and JavaScript to design a web page that allows for the design of Lego minifigures
- I used Swift to implement the webpage as an app for iOS

BeatBox — Jun 2024-Present

- I used Python to create a MP3 player application which can load and save MP3 files, album covers and then play the tracks with a user friendly UI before moving to an Electron framework
- I used HTML, CSS and JavaScript to implement the application in an Electron framework to allow for improved styling

Snake Jun 2024
- I used Java to implement an OOP based Snake game, with a GUI
- I learnt how to package the game and create an executable file to run on windows

Imperial Eco-Marathon Race Team London, UK
Electronics and Battery sub-teams Sep 2023 – May 2024
- I helped develop and build motor control circuits, safety circuits and electrical architecture within the technical regulations
- I learnt techniques for more efficient circuit design, PCB design and communication between multiple subteams

Further Programming Projects Jun 2023-Present
- I implemented a tree structure in C++ which uses the information gain algorithm to optimize the number of required nodes
- I created a song guessing game in Python which uses the Billboard API to update content based on the current charts
- I implemented a tic-tac-toe game in C++
- I established a file sharing system in Python to transfer files between my devices more efficiently
- I developed a scientific calculator with similar functions to the Casio fx-991 in C++
- I implemented a trading bot in Python to automate buying/selling based on percentage change
- I created an animation of flowers in a vase with their petals opening and falling in HTML and CSS

Remote Control Car Dec 2022-Mar 2023
- I designed and built a remote control car using RF, logic gates, counters and motor drivers
- I built a RF transmitter and receiver using a crystal oscillator to generate the desired carrier frequency, and ASK modulation to transmit the information

Landline Oct 2022-Nov 2022
- I designed and built a PCM transmitter and receiver to create a landline using Op Amps, logic gates and flip flops
- I used fibre optic cables for data transmission over a large distance

Autonomous Buggy Oct 2021-Mar 2022
- I led a team to design and build an autonomous buggy which navigated using ultrasound sensors
- I programmed a PIC microcontroller in basic, and designed H bridge motor drivers using MOSFETs
- I learnt PCB design to reduce the weight of the buggy by using custom PCBs for the motor drivers
- Our design ultimately won a Crest Gold Award

Further Electronics Projects 2021-2023
- I designed and built a voltmeter accurate to 0.5V, between 0V and 9.5V using a ramp generator from a gate level design
- I outlined and built a digital thermometer using a bridge circuit, differential amplifier and an analogue to digital converter
- I built an 8-bit CPU
- I designed and built a shop counter using a state machine and sequential logic from gate level design

ACTIVITIES

Thames Valley Harriers London, UK
3/5K Track Sep 2023 – Present
- I train weekly with the Thames Valley Harriers and have raced 3K and 5K track for both them and Imperial College London

Cycling Manchester, UK
Competitive Cyclist May 2019 – Sep 2023
- I raced competitively across over 5 disciplines including road, track and cyclocross
- I progressed through the British Cycling youth development programme, the Manchester Grammar School's Elite Performer Programme and I was part of a junior development team
- I learnt organisation, resilience and perseverance through years of training and travelling

ADDITIONAL

Programming Proficiencies: Advanced in Python, JavaScript, HTML/CSS; Proficient in C, C++, SQL, Java, Rust, Verilog, React, Electron, Basic, Assembly languages, Flask, Swift
Awards: Dean's List (2023-2024), Paton Electronics Prize (2023), Gold Crest Award, Gold Kangaroo in the Senior Maths Challenge, Silver in the Physics Olympiad and Silver Industrial Cadets Award (2022)