Petra Ratkai

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EDUCATION

MEng Electronic and Information Engineering, *Imperial College London* 09/2019 – present | London, UK

- Currently averageing a First Class Honours across my first and second years
- Year 3 relevant modules: Introduction to Machine Learning (90%), Operations Research (92%), Artificial Intelligence (76%), Network and Web Security (77%), High Level Programming (83%), Performance Engineering (75%) and Embedded Systems (82%)
- Year 2 relevant modules: Instruction Set Architectures and Compilers (76%), Information Processing (74%), Algorithms and Complexity, Software Systems, Communication Systems
- Year 1 relevant modules: Programming for Engineers (88%), Digital Electronics and Computer Architecture (73%)
- Taking an Imperial Horizons French language course alongside the engineering modules

BSc Computer Engineering, 09/2018 – 06/2019 | Budapest, Hungary

Budapest University of Technology and Economics

Completed a year at Hungary's leading engineering university with a First Class average of 4.4/5.0, developing a passion for computer science.

- Relevant modules: Programming, Computer Architectures, System Modeling, Theory of Computing, Calculus
- Took electives: Finance, Ergonomics, Innovative Startups

High School and Hungarian Final Exams, 2012 – 2018 | Budapest, Hungary

Obudai Arpad Secondary School

- Advanced level exams: Physics (98%), Mathematics (94%), English (94%)
- Grade 5/5 in all subjects

PROFESSIONAL EXPERIENCE

Software Development Engineer, *Amazon*

04/2022 – 09/2022 | London, UK

- Completing a 6-month industrial placement at Prime Video Technology, Amazon as part of the Video Quality Analysis (VQA) team
- Participated in numerous training courses, developing an understanding for building scalable AWS **cloud computing** solutions
- Tasked with integrating Amazon's proprietary new low latency streaming protocol into VQA's technology stack
- Documented and benchmarked various prototypes, testing for low latency and security

Undergraduate Teaching Assistant, *Imperial College London*

08/2021 – present

- Providing teaching assistance for first year students in Programming and Mathematics, and for second year students in Compilers

Trading and Technology Talent Program, *IMC Trading*

05/2022

- Participated in a week long trading and technology program at IMC
- I was introduced to the tech stack used at IMC and learned about market making and financial derivatives
- Took part in a trading simulation coding challenge

SKILLS, ACTIVITIES AND ACHIEVEMENTS

Skills

- Excellent in **C++** and **C**
- Good **F#, Python, node js**, **React js** skills
- Proficient in **Networks** and **Security**
- Experienced in using **AWS, Linux** and **Github**
- Familiar with the **Agile** methodology

First Ascent International, *Bending Spoons*

05/2022 | Milan, Italy

I was selected as one of the top 20 most impressive Computer Science students in Europe to attend a 4 day program at Bending Spoons

12th place in the 2016 Hungarian Young Physicist's Tournament (HYPT)

Had to carry out an open-ended Physics experiment, and then present the results

Languages

Hungarian (native), English (fluent), German (advanced), French (intermediate)

Imperial College London Riding and Polo

Have been part of the Imperial College horse-riding competition team, participated in BUCS competitions

PROJECTS

ISSIE, *Interactive Schematic Simulator and Integrated Editor* 01/2021 – 04/2022

- ISSIE is a digital circuit design and simulation application, mostly written in **F#** (Functional Programming)
- Worked on improving ISSIE in a team of 6, refactored the logic responsible for the digital components on a sheet
- Enhanced the application's existing functionality, adding numerous features including symbol rotation and allowing users to customize port positioning
- My team's work was deemed the highest quality out of the 12 groups who completed the project, and was selected to be merged into the main ISSIE codebase.

The Canary 01/2022 – 03/2022

- The Canary is an **IoT network** that uses various sensors to monitor the environment of miners and other underground workers and warn them about safety hazards
- Air quality, temperature and pressure data is agreggated by a Raspberry Pi, which communicates with the **back-end server** via encrypted MQTT
- The categorised data for all nodes in the system is stored in an external database and presented to the user on a scalable **web-app**
- The project was completed in a team of 4, where I was primarily responsible for the development of the back-end server and web application, as well as the provisioning of the **database**.

C compiler 02/2021 – 04/2021

- Implemented a preprocessed C90 to MIPS assembly compiler (in **C++**) in a group of 2 people
- The main features included integer, float and double operations, basic pointer arithmetic, function calls compatible with the GCC conventions and the full range of programming control-flow constructs
- My responsibilities were focused on designing the nodes comprising the abstract syntax tree, and generating the assembly code
- This included storing the context necessary for the compiler to handle the stack and frame pointers, allocate registers, and ensure an ISA compliant state was maintained.

Mars Rover 05/2021 – 06/2021

- Designed a fully integrated rover system in a group of 6 people, where a user could input destination co-ordinates through a web-app which the Rover would follow, performing autonomous pathfinding whilst indentifying and avoiding the obstacles in its environment
- I was involved in designing the **system architecture**, focusing on the communication between the rover and the external components,
- These included the **back-end web server, front-end user application** and MQTT broker, all hosted on an **AWS EC2** instance, as well as an external **database** which would store obstacle positions and the queue of target coordinates for the rover

MIPS CPU 11/2020 – 12/2020

- Delivered a functional and synthesizable MIPS CPU in SystemVerilog and a complete **test bench** in a team of 6 people
- I was responsible for leading the testing subgroup, implemented a virtual MIPS CPU in **C++** that was able to provide a correct reference output our CPU could be compared against
- The work completed was to an extremely high standard, obtaining full marks for the testbench component and a 92% score overall

Circuit Simulator 05/2020 – 06/2020

- Designed and implemented a Circuit Simulator program which performs a transient analysis on electronic circuits
- Input to the program was provided in a netlist format, which needed to be parsed to construct an internal representation
- Supported electrical components included resistors, capacitors, inductors and voltage and current sources, with both direct alternating currents