

## EDUCATION

### The University of the Witwatersrand

BSc (Eng) Electrical & Information Engineering (with Distinction)

Johannesburg, South Africa

2019 to 2022

### King David High School, Linksfield

National Senior Certificate (Independent Examination Board)

Johannesburg, South Africa

2014 to 2018

## SKILLS

**Programming:** C/C++, Python, MATLAB, Mathematica

**Simulation:** LTspice, SIMULINK

**Version Control:** Git, GitHub

**Data Analysis and Visualisation:** Pandas, NumPy, Matplotlib

**Shell and Unix:** Bash/Zsh, Unix core utilities

## NOTABLE PROJECTS

### Final Year Investigation Project

Machine Learning

- Conducted an investigation into and developed a novel low-cost AI toy that can assist in Early Childhood Development.
- Implemented speech recognition and natural language understanding capabilities using modern ML models such as OpenAI's Whisper and Transformers.
- Ported the speech recognition model to a Raspberry Pi and used a children's speech dataset to assess the performance of offline children's speech recognition.

### Final Year Design Project

Machine Learning

- Designed a therapeutic chatbot using GPT-2 and Reinforcement Learning.
- Adapted the input context of GPT-2 and used an empathetic reward function as part of the training objective.

### Switch-mode Power Supply

Power/Control Systems, Electronics

- Simulated and built a switch-mode power supply based on the buck converter topology, achieving an output ripple of less than 1%.
- Implemented negative feedback by modulating the duty cycle to ensure a constant output of 5V, independent of the load.

### Sensor Measurement Analysis using MPI

Big Data

- Wrote a [script](#) to compute statistical indicators for a given data set generated by a sensor in an Inertial Measurement Unit (IMU).
- Achieved a speedup of approximately 4x by leveraging Python bindings for the Message Passing Interface (MPI) as well as a computer cluster to parallelize the computation.

### Temperature Sensor

Embedded Systems

- Designed and built a temperature sensor using the ATmega328P and programmed the logic in Assembly.

### Multi-player Wordle

Full-stack Web Development

- Collaborated with a team of five to develop [MultiWordle](#), a multiplayer version of Wordle. The tech-stack included JavaScript, Express, HTML, CSS, GitHub Actions, and MongoDB.

### Centipede++

Software Development

- Collaborated with a team of two to develop the Centipede computer game in C++.

## EXPERIENCE

### Stream – A Division of VAT IT

Software Engineering Intern

Johannesburg, South Africa

Nov 2020 to Jan 2021

- Developed a versatile PDF generation system using Ruby, JSON, and Microsoft's Mail Merge.
- Enabled non-technical employees to generate customer-specific PDFs, without relying on the software development team, thereby minimising Stream's opportunity costs.

### Stream – A Division of VAT IT

Software Engineering Intern

Johannesburg, South Africa

Dec 2021 to Jan 2022

- Wrote a Ruby script to parse PDFs to structured data. This eliminated the tedious task of looking up duty and tax information for imported products.
- Developed a customisable message dashboard system using a headless Content Management System, Vue, Node.js, HTML, and CSS, enabling non-technical employees to edit Stream's website directly.
- Wrote two sets of comprehensive documentation for the dashboard system. One for the developers and another for the non-technical employees.

## HONOURS AND AWARDS

**Isazi Prize***University of the Witwatersrand*

Awarded to the top 5 information engineering students who achieved an aggregate of 70% and above in their third year of study.

**The Dean's List***University of the Witwatersrand*

The Dean's list recognises the top 10% of students provided that a minimum average/aggregate of at least 70% is obtained on a full curriculum.

**Wits Mathematics Competition***University of the Witwatersrand*

Selected to represent King David High School, Linksfield at the Wits mathematics competition in 2018.