Stuart Ballantyne

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Education

University of St Andrews, BSc (Hons) in Physics — 2018 – PRESENT

- Year four (final), expected graduation June 2022
- Modules include: object-oriented programming (using Java), multivariate and vector calculus, linear algebra, mathematical modelling, electronics, computational physics, optoelectronics, signal processing, data mining, transferable skills

Bathgate Academy — 2012 – 2018

- **Advanced Highers:** Mathematics, Computer Science, and Physics
- **Highers:** Mathematics, Computer Science, Physics, Chemistry, and English

Experience

Canon Medical Research Europe, Software Engineering Intern — JUNE – AUG 2021

- Prototyped a client-side (web browser based) 2D medical image renderer, comparing performance of renderers built using SDL+WebAssembly, GPU.js, and Cornerstone.js
- Learned TypeScript and gained a better understanding of JavaScript
- Presented results to the rest of the company at the end of the internship

Skills

- **Proficient in:** C, C++, Python, Lua, TypeScript
- **Familiar with:** JavaScript, Mathematica, Java
- Knowledge of Git, CMake, Meson, WASM, Node.js, Flask, Travis CI
- Experience using Windows and Linux (Ubuntu, Arch) for development

Projects

Final-year physics project: millimetre wave cloud profiling radar — OCT 2021 – PRESENT

- Project requires upgrading radar control software written in C (NI LabWindows/CVI) to allow for continuous data acquisition
- Conducting a detailed performance characterisation of the radar, in particular assessing effects of ambient temperature on radar stability
- Skills: C, Matlab, signal processing

Two-week physics group project: modelling trajectory of golf balls — APRIL 2019 – MAY 2019

- Led a team of five to model the flight path of a golf ball as part of first-year physics coursework
- Quickly learned Python and the NumPy API so I could develop the model
- Model considered effects such as drag, lift, spin, and effect of dimples on the ball trajectory
- Helped format the 2000-word report using LaTeX; wrote about the underlying physics and the approximations used

Chess engine — DEC 2019 – SEPT 2020

- Created a C++17 chess engine as a pet project
- Improved my knowledge of OOP, data structures, game tree search algorithms, and multithreading
- Uses Meson as the build system, previously CMake
- `https://github.com/sb362/chess-engine`

Chess opening tree — OCT 2021 – PRESENT

- Currently making an opening tree visualiser using C++17
- Expanding my knowledge of data structures (in particular trees), parsing, etc.

Other

- Active member of the St Andrews chess society
- Volunteered and helped 2nd-year Computing Science students during high school
- Volunteered and assisted with running the Lindores Abbey chess tournament