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Oliver Sheldon

Software Engineer || olisheldon.github.io/

EXPERIENCE

AWE

Software Engineer *February 2023 - Current*

Designing and developing modern, high-performance C++ and Python codes for applications in many-particle Physics.

- **C++**
  - Developed low-level, next-generation, parallelized codes targeting HPC systems with CPU and GPU architectures.
  - Consolidated high-level post-processing utilities under one coherent, modular library employing modern C++ style.
  - Led research to modernise areas of code targeting finite element analysis, pseudo-RNG, and convergence analysis.
  - Utilized knowledge in data structures and algorithms to research and propose computational improvements to team.
  - Applied research to guide efficiency improvements in libraries, improving the runtime of some codes by $\sim 100\%$.
- **Python**
  - Delivered highly performant Python codes focused on maintainability, simplicity, and testability.
  - Developed intuitive APIs to provide effective, flexible, and dependable interfaces to high performance codes, creating a gentle learning curve to inexperienced users and a powerful tool for experienced power users.
  - Oversaw expansion of codebase testing, adopting refactoring to improve testability, increasing coverage by $\sim 10\%$.
  - Utilized skills in UX/UI design to develop intuitive and user-friendly GUI (using Tkinter) and CL interfaces.
  - Collated and presented user feedback to product owners to gain insight for future deliverables and design discussion.
- **DevOps**
  - Spearheaded test-driven development and design-by-contract programming within Agile paradigm.
  - Accelerated code robustness with detailed analysis of unit and end-to-end tests, achieved by extensively analysing issues; Findings were presented to product owners, guiding design discussions with focus on modern best practices.
  - Modernised deployment methods and automated code verification and validation using continuous integration pipelines.
  - Supported design discussions with R&D tasks to guide large features into smaller, more manageable issues.
- **Collaboration**
  - Effective collaborator in international code partnership, representing and steering feature prioritization towards our requirements and deliverables. Achieved through remote working and in-person coding trips to the United States.
  - Presented workflow innovations, facilitated through my contributions to code interfaces, to code user base.

EDUCATION

University of Warwick

Computer Science MSc *September 2021 - September 2022*

Grade: Merit

- **High Performance Computing:** Leveraged understanding of advanced computing resources to optimize computational workflows with a focus on C++ programming and GPU utilization. Achieved exceptional performance outcomes.
- **Agent Based Systems (Artificial Intelligence):** Designed, developed, and evaluated agents through topics such as game theory, opponent modelling, and knowledge representation, in competitive and cooperative agent interaction.
- **Algorithm Design:** Completed tasks utilizing concepts of algorithm design, complexity, and mathematical and statistical methods. Adapted these algorithms to create powerful models to analyse and predict cryptocurrency markets.
- **Data Mining:** Deployed machine learning models for regression and classification problems, utilizing deep learning tools such as convolutional neural networks using TensorFlow/PyTorch. Determined optimal pipeline for classification and produced convolutional neural network for cell images regression task, achieving 93% in this open-ended work.
- **Advanced Computer Security:** Utilized theory to solve classical and modern crytography (PKI), system security, hardware security, network security, and blockchain problems in a Linux virtual machine using the C language.
- **Image and Video Analysis:** Produced solutions for computer vision tasks such as image recognition, motion estimation, denoising, feature recognition and tracking using tools such as neural networks, OpenCV, SIFT, and KD-Trees.
- **Dissertation Project:** Applications of Machine Learning for imaging data compression.

University of Lancaster

Theoretical Physics BSc Hons *September 2018 - July 2021*

Grade: First-Class Honours, achieving first-class marks in all exams.

SKILLS

• C++	• Rust	• HPC	• SDLC	• API Design	• OOP	• SQL
• Python	• Bash	• DevOps	• Unit Testing	• Git	• HDF5	• CMake
• Java	• FastAPI	• Agile	• TDD	• GitLab	• Linux	• CI

CERTIFICATIONS

- Advanced Python: Best Practices and Design Patterns
- Introduction to Advanced Software Testing Methods
- SecDevOps Foundation® (SDOF) Certification

PROJECTS

- Advent of Code 2023: Python solutions presented with descriptions of the thought-process behind them.
- Data Structures & Algorithms: Notes & Applications.