Ross Gardiner : *Curriculum Vitae*

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Programming Languages

Python, C++, C, Haskell, Java, C#, LaTeX, MATLAB, HTML/RST

Recent Technologies

Linux, OpenCV, Tensorflow/Keras, NVIDIA CUDA, MS .NET, Qt, Doxygen, Sphinx, PiCamera, Google Test, Docker, Jenkins

Miscellaneous Skills

UK Driver's Licence, Video and Photo Editing, Electronics Design/Manufacture, Vehicle Repair, Woodwork

Awards/Recognition

Year in Industry Contribution to the Business Awards, Scottish Winner (2016)

Year in industry IETF Future Industry Leaders Awards Runner up innovation prize (2016)

Leonardo Employee

About

Enthusiastic **Electronics and Software Engineering graduate** with some relevant experience. I have a keen interest in applications of machine learning for climate justice, medicine and/or ecological good. Currently seeking roles with positive impact on people and planet wherein a strong foundation in research work and software engineering may be applied.

Employment History

DynAikon Ltd. – June 2021–Present — Entirely Online

Software Developer & Research Assistant

Presently, I am working as the project lead on our software package, DynAikonTrap. This is a fully open source (hardware and software) camera trap with AI capability and integration with our web API for observation logging. Our design is currently novel, using video encoding artefacts and convolutional neural networks to detect animal presence in a live video feed. Inner workings are explained in our recently published paper, of which I am a co-author.

As project lead, I am involved not only in every aspect of code development but also with communication, product support and liaison with our funding consortium. I also produced my final-year MEng research project from work completed on DynAikonTrap: successfully halving the system power consumption, accelerating our CNN detectors via quantisation and adding AI capability to distinguish humans from animals.

Technologies currently in use:

- **Python** programming language is used throughout while **Cython** is used for some real-time video processing aspects. **C/C++** is used for our video decoding library.
- **Sphinx** handles our automated documentation generation. A **GitLab CI-runner** compiles and publishes docs to our website via a **Docker** container.
- Deep learning and computer vision capabilities are provided through the **OpenCV** library and **TFLite** runtime. Model training has been undertaken using the **Tensorflow** object detection API.
- As a hardware platform, we use the **Raspberry Pi** system and we package our software for compatibility with **Ubuntu/Linux** systems.

Imagination Technologies – June–Sept. 2020 — Kings Langley, Watford

Vision & AI Research Intern

I joined the Compiler Team as a Research Intern. My given task was to review metrics for quantifying neural network inference quality at different weight quantisation degrees. In particular, I looked at generative adversarial networks (GANs) and created a **Python** integration test running on a **Jenkins** server. I put these metrics to use as part of an existing fault checking pipeline for compiler releases. I learned to work in an **Agile** team, participating in regular stand-ups and produced detailed reports on chosen metrics from the available literature.

Leonardo UK Ltd. – Aug. 2018–June 2019 — Crewe Road, Edinburgh

Undergrad Placement Engineer (Systems Dept.)

During a gap year from university, I worked a year-long placement at Leonardo to further develop radar simulation products. Given full responsibility and ownership of accelerating software released to external customers quarterly; my work involved reading academic papers on computer graphics and algorithm implementation for **real-time GPU processing**. To implement solutions, the NVIDA **CUDA** API was chosen and challenges overcome in quickly learning this new technology. I ultimately left the team with a well-received report containing general techniques for hardware acceleration along with several examples where these were applied to existing products.

Leonardo UK Ltd. – June–Sept. 2017 — Crewe Road, Edinburgh

Summer Placement Engineer (Systems Dept.)

I returned to Leonardo as a summer student, continuing development of my radar imaging simulation. Working as part of a wider team focused on exploiting hardware acceleration to speed up compute-intensive simulation, I was introduced to various methods which accelerate code execution in both **C#/.NET** framework and using NVIDIA's **CUDA** C API. Responsibilities included attending weekly progress meetings, keeping an appropriate lab book and delivering presentations on completed work. Ultimately, my code-base saw a 10 times speedup. Simulations which would have been run overnight can now complete in a lunch break.

Leonardo UK Ltd. – August 2015 –July. 2016 Crewe Road, Edinburgh

Year in Industry Student (Systems Dept.)

From high-school, I was selected for a single space on Leonardo's Systems Engineering Year in Industry programme. I was responsible for R&D of software to simulate a specialised synthetic aperture radar ground imaging mode. My solution works by performing a "virtual" flight trial on **digital terrain** gathered from freely available **map data**. Coming into a research-based project straight from school required a great deal of adjustment: I enrolled in a five-day company radar course; learned to write robust and reliable **C#/.NET** software adhering to company standards and built tenacity in addition to recognition of my own limits and when to seek guidance. Upon finishing the year, I was selected for several Year in Industry awards and was subsequently invited back to Leonardo the following summer.

Education

MEng, Electronic and Software Engineering – Sept. 2016–June 2022 University of Glasgow

I graduated from the James-Watt School of Engineering **with Honours of the First Class**. My degree includes a practical mix of electronic design with computing science theory and application. Throughout my studies, I have gravitated more towards the software engineering elements of the degree and especially programming embedded systems in C/C++. I also got involved with societies during my time at Glasgow. For GUSTS - Glasgow University Sustainable Technology Society and served as Projects manager in the 2020-2021 committee group and helped organise events promoting sustainable engineering projects on campus. I have also been a member of the surf club and enjoyed trips out with friends catching swells.

Selected achieved grades tabulated below; achieved an **overall GPA of 18.6/22.0**:

Course	Grade	Year	Course	Grade	Year
Individual Project (Final Year)	A2	5th	Digital Signal Processing	A3	4th
Real-time Embedded Programming	A2	5th	Renewable & Sustainable Energy	A4	4th
Design Special Topic	A4	5th	Digital Circuit Design	A1	3rd
Functional Programming	A2	4th	Electronic System Design	A2	3rd

Open University Modules – 2014–2016 Open University (Online)

Throughout my final year of high-school and my Year in Industry placement, I studied remotely for M250 - Object-oriented Java programming and M269 - Algorithmns, data structures and computability, achieving a Pass grade for both. These modules have served as my first qualification in the computing/software engineering world and helped fuel my early interest in the subject.

Peebles High School – 2010–2015 Springwood Rd, Peebles

Open-Sourced Software Projects

I am passionate about open sourced software. Many of my own contributions to software in the public domain are available on my personal GitHub site and through DynAikon's public git repository. Below are some example projects I am proud of.

DynAikonTrap - AI Camera Trap for Biodiversity Monitoring – June 2021–Present Python/C

Codebase: `gitlab.dynaikon.com/dynaikontrap` Our published paper: `doi.org/10.1016/j.ecoinf.2022.101657`
Documentation: `dynaikon.com/trap-docs/` My final-year dissertation:

Signapse - AI Sign Language Teacher – Jan.–May 2022 C++/C

A simple event-driven video processing app using a convolutional image classifier to teach hand signs via a user interface.
Codebase: `github.com/albanjoseph/Signapse` Wiki: `github.com/albanjoseph/Signapse/wiki`
Documentation: `albanjoseph.github.io/Signapse`

AudiClean - Event-driven Audio Filtering Library – Jan.–May 2022 C++/C

Extension of the SoX audio library, provides implementation of novel audio filtering mechanisms and a command-line interface.
Codebase: `github.com/rossGardiner/AudiClean` Documentation: `rossgardiner.github.io/AudiClean`

NextSteps - Sports-ground Test Equipment Driver – Sept. 2019–May 2020 Java

Codebase: `github.com/rossGardiner/next-steps`

Personal Interests

In my free time I am keen on exploring the great outdoors. My favourite past-times are **camping, climbing and surfing** when I get the chance. During time off, you can find me exploring the west coast with my girlfriend in our camper van and throughout much of this summer I have been enjoying Scotland's diverse range of **rock climbing** venues. I also love training for climbing and bouldering in my local gym and take a keen interest in fitness and nutrition.

. How's my work? I'd be thrilled to receive any feedback on my CV you may have: complete my survey.
. This CV has been created and edited using LaTeX, the style sheet used is provided under GPLv3 on my GitHub.