Ross Gardiner : *Curriculum Vitae*

Updated: 4th March 2024

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Programming Languages

Bash, Python, C++, C, Haskell, Java, C#, LaTeX, MATLAB, HTML/CSS

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, Rock Climbing

Awards/Recognition

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

Year in industry IETF Future Industry Leaders Awards: Innovation Prize (2016);

Leonardo Employee Recognition Award (2019)

About

Enthusiastic **MEng Electronics and Software Engineering graduate** embarking on a **PhD in Environmental Intelligence** at the University of Exeter. I have a keen interest in applications of machine learning for climate justice, medicine and/or ecological good. Currently seeking roles complementary to my PhD, working with cutting-edge technologies wherein a strong foundation electronics, software engineering and AI methods may be applied.

Employment History

University of Exeter – September 2023 – Present — University of Exeter

Postgraduate (PhD) Researcher and Teaching assistant

Engaged in pioneering research within the Centre for Doctoral Training, focusing on the application of AI technologies for mitigating environmental risks. Concurrently working as a Teaching Assistant, responsible for delivering and grading undergrad' laboratory sessions, thereby contributing to the academic development of students in the field of environmental science.

Freelance Work – March 2023 – August 2023 — Remote and On-site

Electronic Engineer

Delivered comprehensive electronic engineering solutions for two projects for a small renewables business in Lerwick, Shetland. Both projects included the delivery of charge controllers designed by myself, this included electronic circuit design and specification of components, layout planning, and board manufacturing/assembly. Additionally, I engineered robust event-driven firmware for Microchip PIC devices for all programmable aspects of my design.

DynAikon Ltd. – June 2021–March 2023 — Entirely Online

Software Developer & Research Assistant

I worked primarily as the project lead for our software package, DynAikonTrap. This is a fully open source camera trap with some AI capability and integration with our web API for observation logging. This is a novel design, using video encoding artefacts and convolutional neural networks to detect animal presence in a live video feed. Aspects are discussed in our paper. As project lead I have been involved in every aspect of software development, 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 weight quantisation and adding capability to distinguish humans from animals in video feed.

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

Vision & AI Research Intern

As a Research Intern on the Compiler Team, I reviewed image analysis metrics to assess neural network inference quality, focusing on images from generative adversarial networks (GANs). I developed a **Python**-based evaluatory test for a **Jenkins** server, integrating these metrics into the compiler's existing fault-checking pipeline. My role included Agile team collaboration, regular stand-ups, and producing detailed reports on the selected metrics.

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

Undergrad Placement Engineer (Systems Dept.)

During my university gap year, I completed a year-long placement at Leonardo, focusing on radar simulation product development. I was responsible for quarterly software releases, involving research on real-time GPU processing and algorithm implementation. Utilizing NVIDIA CUDA API, I overcame the challenge of mastering new technology, contributing to hardware acceleration techniques. My tenure concluded with a comprehensive report detailing these techniques and their application in existing products; this was well received by my peers.

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

Summer Placement Engineer (Systems Dept.)

As a summer student at Leonardo, I advanced my radar imaging simulation project, working in a team to utilize hardware acceleration for faster simulations. I explored **C/.NET** and NVIDIA **CUDA C** API for code execution acceleration, contributing to a 10x speed-up in the simulation process. My responsibilities included weekly progress meetings, maintaining a lab book, and presenting completed work. This enhancement allowed simulations that previously ran overnight to be completed within 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. I have enjoyed working on team projects throughout my studies. For two such projects in my final year, I took on the role of lead programmer. This involved managing our team's overall direction and ownership of event-driven software in **C/C++** . As part of GUSTS - Glasgow University Sustainable Technology Society I served as Projects Manager in the 2020-2021 committee group and helped organise events promoting sustainable engineering projects on campus. I've also been a keen member of the University Surf Club, which has been a lot of fun. Finally, I enjoyed serving as a lab demonstrator for a **Python** web app development course, where I learned teaching methods and solidified my own knowledge.

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: gitlab.dynaikon.com/rossg/2190583_Gardiner_ENG5041P_Final_Year_Report/

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.