David Wood

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Open Source

Rust Programming Language
Compiler Team Co-Lead   Aug 2023 – Present

In collaboration with my compiler team co-lead, I'm responsible for representing the Rust compiler team; owning the compiler team's decisions; making unilateral approval for trivial or urgent issues; driving the team's weekly meetings; communicating with other members of Rust leadership; authoring communication on behalf of the team; and supporting compiler team members in their contributions.

Rust Programming Language
Compiler Team Member   Oct 2017 – Present

As member of the Rust compiler team, I am responsible for the implementation and maintenance of the Rust compiler, which involves having merge privileges; being assigned patches to review; fixing high-priority bugs; and reviewing backports, major change proposals and compiler RFCs.

I regularly contribute bug fixes, diagnostic improvements and refactorings; as well as lead or contribute to engineering efforts to implement new features in the Rust compiler. Since starting to contribute to Rust, I have been involved in various working groups, including: async/await, diagnostics, debuginfo, meta, polymorphization and non-lexical lifetimes.

Work Experience

Huawei Technologies Research & Development UK Ltd.   Edinburgh, Scotland
Senior Software Engineer A, Programming Languages Lab   Nov 2022 – Present

I primarily contribute to the upstream Rust project, continuing my various ongoing engineering projects and duties as a compiler team member and co-lead. Within Huawei, I assist teams with their Rust adoption and upstream contributions; participate in the Huawei's Rust Technical Management Committee; and give talks on Rust and its compiler.

I'm also involved in development of Huawei's own programming languages, where I have contributed to the implementation of automatic differentiation and led the design and implementation of constant evaluation and constant generics.

I've been awarded Huawei's "President Award of the 2012 Laboratories", "President's Award of the European Academy", "Gold Team Award" and "Innovation Spark Award"; as well as been published in Huawei People magazine.

Huawei Technologies Research & Development UK Ltd.   Edinburgh, Scotland
Senior Software Engineer B, Programming Languages Lab   Aug 2021 – Nov 2022

Codeplay Software Ltd.   Edinburgh, Scotland
Senior Software Engineer, Infrastructure   Nov 2020 – Aug 2021

I was the primary maintainer of Codeplay's continuous integration infrastructure and led the effort to rebuild the core infrastructure with NixOps to improve reproducibility.

In addition, I worked as a compiler engineer on SYCL support for NVIDIA GPUs which was contributed to Intel's DPC++. I implemented driver support in Clang for the `nvptx64-nvidia-nvcl-sycldevice` target; target-specific passes in LLVM; builtins in libclc; and various bug fixes to LLVM, Clang and the LLVM-SPIRV translator.

Codeplay Software Ltd.   Edinburgh, Scotland
Software Engineer, Infrastructure   Sep 2017 – Nov 2020

Scottish Engineering   Glasgow, Scotland
Software Consultant   Sep 2018 – Nov 2018

Codeplay Software Ltd.   Edinburgh, Scotland
Intern Build Engineer   May 2017 – Sep 2017

During a summer, I rebuilt the entirety of Codeplay's continuous integration infrastructure in my internship - introducing automated re-provisioning of Ubuntu, CentOS and Windows build nodes and improving the configuration management, vastly reducing the turn-around time of changes requested by engineering teams and downtime which impacted engineering team productivity. In addition, I made various improvements to internal tools relied on by engineering teams.

| **West Dunbartonshire Leisure** | Alexandria, Scotland |
| *Software Consultant* | Apr 2015 – Feb 2017 |

| **Polaroid Eyewear** | Dumbarton, Scotland |
| *Software Consultant* | Jun 2014 – Jun 2016 |

Education

| **University of Glasgow** | Glasgow, Scotland |
| *MSci Software Engineering with Work Placement, Honours of the First Class* | Sep 2015 – Jun 2020 |

I graduated with a GPA of 20.0 (out of a maximum 22.0) and completed my Master's Project on "Polymorphisation" [1], an code-size optimisation in the Rust compiler to reduce unnecessary monomorphisation during code generation. In my first year, I was awarded "Best Computing Science Student Intending Single Honours" and in my final year, "Most Outstanding Project in MSci SE WP".

In my third year, I worked in a team tasked with creating a event-sourced financial platform [2] [3] for Avaloq, a banking software company. For the duration of the project, I managed and led development on the event bus and the "superclient". Both written in Rust, the event bus is the central server that manages and persists events while ensuring consistency, correlation and horizontal scaling of microservice clients; the superclient is a framework for building client applications in Lua with persistence and exposing a REST API.

Additionally, this involved working with the team to design and implement the various solutions that allowed the system to achieve the desired properties; to streamline and improve our development processes; and to mentor other team members in fixing bugs and building features when working with unfamiliar technologies.

| **Glasgow Caledonian University** | Glasgow, Scotland |
| *Nuffield Foundation Placement* | May 2014 – July 2014 |

While on a summer placement at Glasgow Caledonian University, I implemented a colour-based tracking algorithm from a research paper in C++ with OpenCV [4] [5] which was capable of full 360 tracking of multiple objects simultaneously including when the object leaves and re-enters the frame.

Furthermore, I built a tool for non-photorealistic rendering using OpenCV to make an image look less realistic - in essence, creating a cartoon out of an image. Images were processed in two distinct stages - extracting the edges from the image and overlaying them on a copy of the original image that uses a reduced set of colours.

| **Vale of Leven Academy** | Alexandria, Scotland |
| *Secondary Education* | Aug 2009 – May 2015 |

Memberships

| **Institution of Engineering and Technology** | |
| *Associate Membership* | May 2023 – Present |

| **British Computer Society** | |
| *Professional Membership* | Jun 2020 – Present |

| **Open Source Initiative** | |
| *Individual Membership* | Feb 2020 – Present |

Published Articles

Inside Rust Blog	
Contribute to the diagnostic translation effort!	August 2022
Inside Rust Blog	
Improving async-await's "Future is not Send" diagnostic	October 2019

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[1] https://davidtw.co/media/masters_dissertation.pdf
[2] https://davidtw.co/media/autokrator_dissertation.pdf
[3] https://davidtw.co/media/autokrator_presentation.pdf
[4] https://davidtw.co/media/camshift_report.pdf
[5] https://davidtw.co/media/camshift_poster.pdf