

AMBER

Low-level programmer, Driver developer, Reverse Engineer

@ garnet@disroot.org

they/she

Lazio, Italy

TECH

C



10 years of experience, 3 years for hardware drivers and reverse engineering tools.

Assembly Language



Writing critical code in assembly for both x86 and RISC-V. Experience with reading armv7.

Hardware Drivers



Writing drivers for various pieces of modern hardware and reading technical specifications, see the projects section for more details.

Reverse Engineering



Familiar with Binary Ninja, Ghidra, IDA and Frida.

C++



Not much experience, mostly for the purposes of reading C++ codebases, wrote code for some fairly medium-to-large codebases.

Low-level languages



Basics of most commonly used low-level languages: rust, zig, nim, D and can easily get up to speed with developing in them even if I lack direct experience in them.

Functional Languages



Familiar mainly with Haskell but also some experience with Coq, Idris 2 and Agda.

Scripting languages



Experience using python, julia, lua.

NATURAL LANGUAGES

English



Primary language.

Italian



Native language.

LINKS

codeberg: <https://codeberg.org/Garnet>

PROJECTS

Graphics driver reverse engineering

2022

Reverse engineered the graphics driver for the PowerVR SGX540 GPU found in the Texas Instruments TI OMAP 4430 SoC.

Wrote most of the dynamic reverse engineering tooling used including an armv7 debugger supporting watchpoints.

There is a [full writeup](#) on my blog.

Driver development

2019-2022

Wrote drivers in hobby operating systems for the following devices:

- NVMe
- USB 3.0 Stack, including XHCI
- Intel Ivy Bridge GPUs

Operating System development

2019-2022

Implemented many components and worked on related software:

- PXE support for a bootloader
- ext4 read support for an ext2 driver
- Event system supporting multi-event waiting and timeouts
- improvements to QEMU hardware emulation
- Basic Intel VMX support
- Porting a small example os to a new RISC-V development board

Firmware reverse engineering

2020-2022

Familiar with reverse engineering PC UEFI firmware, primarily for bug fixing and exploration purposes.

System Administration

Administrated a small home network using multiple VLANs and a virtualized router and remote ZFS storage for the VM host.

Assembly Programming

2021-2022

Implementation of various low-level routines in x86 assembly and vectorized algorithms using the newly released RISC-V vector extensions.

EXPERIENCE

I have been writing software since 2011, most of it for personal use.

I'm experienced with working in low-resource computing environments like embedded devices and bare metal in general.

I'm particularly fast at picking up new technologies and especially at quickly understanding and dissecting large projects, I have experience with the internals of QEMU, Linux, LLVM and Mesa. I have contributed a regression fix to Mesa.

I am well-versed in computer architecture and the microarchitecture of common CPUs and GPUs.