Kelsi Davis

Versatile Software Engineer · Operating Systems · Embedded · Scientific Computing

Pacific Northwest · dumbandroid@gmail.com · +1 360 207 9887
Portfolio: geekastro.dev · github.com/Kelsidavis · ORCID: 0009-0003-8930-8246

Professional Summary

Software engineer and independent researcher with 10+ years building systems software where it meets hardware. Track record of shipping open-source operating systems, custom firmware ports, reverse-engineered ports of legacy hardware/software, and image-processing pipelines for scientific work. Two peer-archived publications in AI-assisted reverse engineering and signal-processing methodology. Comfortable owning projects end-to-end — board, kernel, application, docs, and release.

Selected Projects

WoWee — open-source World of Warcraft engine experiment
`C++20 · Vulkan · 418★ · Hackaday-featured (Feb 2026)`
From-scratch open-source client for World of Warcraft (Vanilla, TBC, WotLK protocol-compatible), native C++20 with a custom Vulkan renderer. 80+ releases, modular architecture, comprehensive docs for asset pipelines, authentication, and server setup. Independently maintained, community-driven. Covered by Hackaday and TechEblog in Feb 2026.

System7 — Apple Macintosh System 7 reimplementation `C · 290★ · GRUB2/Multiboot2 · Hackaday-featured`
Open-source reimplementation of Mac System 7 for modern x86 hardware, reconstructed from binary analysis using AI agent orchestration and QEMU verification (3 days, documented in Zenodo paper).

Futura — capability-based nanokernel OS `C`
Modern nanokernel emphasizing minimalism and clean separation between kernel and userland through Fast Inter-Process Communication (FIPC).

Anycubic Kobra Neo firmware ports — Marlin & Klipper `C / C++ · HC32F460 · ST7789V`
Marlin 2.1.x firmware port (full TFT UI, bed leveling, input shaping, linear advance) plus a Klipper build with a custom ST7789V display driver.

planet-deconv — single-frame planetary deconvolution (research code) `Python · U-Net · WIP`
U-Net experiment trained on PIPP / AutoStakkert!3 outputs to explore whether single-frame deconvolution can approach lucky-imaging stack quality. Early-stage research, not yet a finished tool.

Astrocalibrator — FITS calibration pipeline `Python · GUI`
GUI-driven tool that automates dark/flat/bias correction, multi-filter handling, WCS alignment, stacking, and plate solving for astrophotography workflows.

cache-goblin — Power Mac L2 cache reverse engineering `Python · PowerPC`
Reverse-engineered the L2 cache card for the Power Macintosh 6400/6500: schematics, protocol notes, and Python tooling.

pioneer-doppler-reanalysis — reproducibility study Python · Astrophysics

Independent verification pipeline reproducing Doppler-anomaly analyses for Pioneer 10/11 from public data.

Custom telescope mount control & photometry ESP32 · Teensy · AVR · Python

Designed and programmed embedded systems for robotic telescopes — tracking mounts, stepper-motor focusers, and autonomous control boards. Built a high-speed mount that locks on to the ISS at >1°/sec from real-time TLEs. Captured a transit photometry light curve confirming exoplanet TOI-1853b.

Experience

Independent Software & Embedded Systems Engineer · Self-employed 2009 – Present · Remote · Kelso, WA

- Designed and programmed embedded systems (Arduino, ESP32, AVR, ARM) for robotic telescopes, 3D printers, and precision imaging.
- Built custom hardware: tracking mounts, stepper-motor focusers, autonomous control boards.
- Developed software pipelines for real-time motion control and data acquisition in Linux environments.
- Reverse-engineered Apple System 7 and ported it to C for x86 and ARM (System7 — 290★, featured on Hackaday).
- Released Futura, a capability-based nanokernel OS emphasizing minimalism and FIPC.
- Ported Marlin and Klipper firmware to the Anycubic Kobra Neo (HC32F460), including a custom ST7789V display driver.
- Maintained 50+ open-source repositories on GitHub (github.com/Kelsidavis), including WoWee (418★) and System7 (290★).
- Supported global users remotely; maintained servers and automated astrophotography workflows.

City Letter Carrier · United States Postal Service Jul 2014 – May 2020 · Longview, WA

- Managed multiple delivery routes while upholding strict reliability and security standards.
- Demonstrated discipline and precision under high-accountability federal service.

Project Manager · America's First Choice / Topthenet.com Jun 2009 – Jul 2011 · Kelso, WA

- Oversaw web development and infrastructure support for online marketing operations.
- Led a small team building SEO-driven websites and campaign automation tools.
- Contributed to backend logic, graphic design, and cloud resource management.

Additional roles: Driveline Retail Merchandising (2008–2009) · Berry Plumbing (2007–2008) · Pacific States Investments (2006–2007) · U.S. Security Associates (2006).

Publications

Leveraging Artificial Intelligence for Automated Reverse Engineering of Legacy Software Systems — Zenodo (2025)

AI-assisted framework that recreated Apple System 7.1 from binary analysis within 3 days using agent orchestration and QEMU verification.

https://zenodo.org/records/17196870

Reassessing the Role of Doppler Drift in Technosignature Discrimination — Zenodo (2025)
Framework for identifying Doppler-invariant technosignatures using distance-aware signal models.
`https://doi.org/10.5281/zenodo.15514188`

Skills

Languages
C · C++ · Python · Kotlin · Rust · TypeScript · PowerShell

Systems & OS
Linux kernel & systems programming · Operating-system development · Reverse engineering · Multiboot2 / GRUB2 · QEMU

Embedded
AVR · ESP32 · ARM Cortex-M · Teensy · HC32F460 · KiCad PCB design · Marlin · Klipper

Domains
Image processing · Scientific computing · AI / ML · Telescope automation · Astrophotography · SDR / DSP

Tooling
Git · GitHub Actions · CI/CD · GitLab · Docker

Web
React · Node.js · Astro · TypeScript

Education

Engineering — Community College Coursework — Lower Columbia College, Longview, WA
`Apr 2003 – Dec 2005`

High School Diploma — Kelso High School, Kelso, WA `Jun 2004`

Awards & Certifications

- Fine Art America Billboard Contest (2021) — winning artwork featured nationwide.
- IBM SkillsBuild: Artificial Intelligence Fundamentals
- IBM Enterprise Design Thinking Practitioner
- Google Digital Garage: Fundamentals of Digital Marketing
- University of Arizona: Astronomy — Exploring Time and Space

Driver License: Valid · GMRS license