

Fredrik L. J. Wilke

fw2462@nyu.edu | [linkedin.com/in/fljwilke](https://www.linkedin.com/in/fljwilke) | github.com/F-Wilke | New York City, NY

EDUCATION

- New York University, Tandon School of Engineering** New York, NY
Ph.D. Candidate in Computer Science — Advisor: Prof. Justin Cappos Jun. 2026 – Present
- Boston University** Boston, MA
M.S. Computer & Electrical Engineering, GPA: 4.0/4.0 — CoE Graduate Scholarship Sep. 2025 – May 2026
• Thesis: *Kernel as a Shared Object: Dynamic Privilege with Dynamic Linking* (Advisor: Prof. Appavoo)
- Hamburg University of Technology (TUHH)** Hamburg, Germany
B.S. Computer Science, GPA: 1.6/1.0, Top 5% (German scale: 1.0 = best) Aug. 2022 – Aug. 2025
• Thesis: *Persistent Live Firmware Patches for Cortex-M7 Based Microcontrollers* (Advisor: Prof. Kulau)

RESEARCH EXPERIENCE

- NYU Secure Systems Lab** New York, NY
Graduate Researcher — Prof. Justin Cappos Jun. 2026 – Present
• Extending **Lind** (WASM-based sandbox) to Intel **MPK**-enforced isolation; implementing in **Rust** with deep focus on Linux user/kernel boundary semantics (syscall dispatch, fault handling, signal delivery).
- Boston University** Boston, MA
Graduate Researcher Sep. 2025 – May 2026
• **Kernel as a Shared Object** (Prof. Appavoo & Prof. Krieger): Prototyped loading Linux as a dynamic shared object for runtime-adjustable privilege boundaries. Mastered x86 internals (IDT, syscall trampolines, fault/NMI handlers, context-switch paths); verified assembly-level patches with **GDB**.
• **Cross-VM Page Cache Attacks** (Prof. Trachtenberg, ECE): Extended Flush+Reload side-channel attacks across **gVisor**, **Firecracker**, **KVM/QEMU**; engineered sub-microsecond-precision experiments with controlled suppression of hardware prefetchers and DVFS.
• **RTOS Dynamic Linking** (Prof. West): Ported **musl libc** and its dynamic loader to **Quest** RTOS; deepened expertise in ELF relocations, PLT/GOT mechanics, and OS-agnostic loader design.
• **GPU LibOS** (Prof. Appavoo): Applied scalable-OS resource-discovery concepts to persistent **CUDA** kernel management, reducing per-launch overhead; gained familiarity with GPU driver and scheduling paths.

PROJECTS

- Full-Stack Automotive Infotainment Retrofit** | *C, Linux drivers, I²C/I²S, PCB design, Bluetooth* 2019 – 2024
• Modernised a 1980s OEM car-phone unit (Porsche/Mercedes) end-to-end: designed custom modular **PCBs** for sensor and codec integration, wrote **Linux kernel drivers** for I²C/I²S peripherals, and RF spectral-analysis software on embedded hardware. Full ownership from schematic capture through Bluetooth application layer.
- Monte Carlo Option Pricing on FPGA** | *VHDL, Vivado, Vitis HLS* 2026
• Implemented a European options pricer using Monte Carlo simulation; applied pipelining, loop unrolling, and resource-sharing to maximise throughput within LUT/DSP constraints.

PROFESSIONAL EXPERIENCE

- Filiago GmbH & Co. KG** (satellite/fiber internet provider) Bad Segeberg, Germany
Software Developer → Senior Software Developer Sep. 2019 – Aug. 2025
• Led a team of 5 developers; designed **control- and data-plane architectures** for fibre deployments; developed an **HTTP acceleration** scheme for high-latency satellite links; drove migration to a **microservice architecture**.
• Migrated on-premise IT infrastructure to the cloud (50% annual cost reduction); ultimately to self managed multi-cloud **Kubernetes** deployment.
• Developed integrations between **MS Business Central** and satellite/fibre operational support systems in **MS AL** across a large production codebase; applied **journal-based** recovery mechanisms to ensure consistency and fault tolerance in a high-availability billing and provisioning pipeline.

TALKS & PAPERS

- Cross-VM Page Cache Attacks: gVisor and Beyond* — Talk, New England Systems Day, 2026; paper submitted for publication (with Prof. Trachtenberg)

TECHNICAL SKILLS

- Languages:** C, C++, Rust, Python, Bash/Shell, x86 Assembly, CUDA C/C++, VHDL, C#, MS AL, JavaScript
Systems & Tools: Linux kernel (build/debug/patch/drivers), GDB, QEMU/KVM, gVisor, Firecracker, WASM/Wasmtime, Intel MPK, ELF / dynamic linking, Vivado / Vitis HLS, Git
Concepts: OS internals (syscall/interrupt/fault paths, context switching), container & VM isolation, side-channel analysis, network protocol engineering, FPGA optimisation, embedded systems, PCB design
Human Languages: German (native), English