Anton Melnychuk

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EDUCATION

Yale University, B.S. in Electrical Engineering & Computer Science *May 2026 (Senior)*

- **Relevant Coursework (GPA 3.65/4):** Computer Architecture (EE)†, Introduction to VLSI System Design (EE), Building Distributed Systems, Big Data Systems (Disaggregated Infra), Computer Networks, Building AI Infra Systems, Design and Implementation of Operating Systems†, Principles of Computer System Design.

Osaka Gakuin University, Study Abroad Japan, Intermediate-Advanced Japanese. *Jun 2023 - Aug 2023*

Programming: Rust; C; C++; SystemVerilog (VHDL; Python; Go; Bash; x86-64 asm; Systemd)
Technologies: Linux; eBPF/LKM; Xilinx (Vivado, Vitis); Yocto; AWS/GCP; K8s; Terraform; git
Language Skills: English; Ukrainian (Native); Russian; Japanese (Advanced); Polish (Limited)

RELEVANT WORK EXPERIENCE

Thesis, Brain Computer Interfaces (Prof. Bhattacharjee) *July 2025 −Present (Ongoing)*

- Reorganized pipeline and RTL/VLSI peripheral interfaces for the previously taped-out HALO, a pipelined neural-processor BCI ASIC accelerating neural signal processing to 46 Mbps within an ultra-low-power budget.

Research Intern, Yale Efficient Computing Lab (Prof. Lin Zhong) [View] *Jan 2024 - Present [1.5 year]*

- Setup and implemented Vivado PS/PL design for a QEC decoding system that overcomes real-time 100 logical qubit decoding resource constraints using a distributed GTX Aurora SPF+ network of 5 Xilinx VMK180 FPGAs.
- Partnered with AMD to co-develop a scalable SoC management tool for remote VFS−based deployment of Xilinx Versal/UltraScale+ FPGAs, enabling Linux runtime reconfiguration (ConfigFS) and A/B fallback reboot full-swapping.

Rust Operating System, System Programming Course [View] *Sep 2024 - Apr 2025 [8 month]*

- Developed rWeensyOS (5k+ LOC), a minimal POSIX-compatible teaching-purpose microkernel written in memory-safe Rust with FFI bindings to a C/x86_64 assembly bootloader; adopted by Yale's core systems course (Spring '24).
- Assisted on a prototype Rust-based network driver for Theseus, experimental Rust operating system, with support for high-throughput NICs (e.g. 10GbE), integrating eBPF hooks for dynamic packet filtering and runtime safety analysis.

Embedded Engineer, Iron Flight (Ukraine Humanitarian Drone R&D) *July 2024 - December 2024 [5 month]*

- Partitioned drone DNN workloads from STM32 MCU to a remote host with onboard FPV goggles.

OPEN SOURCE CONTRIBUTOR

Rust for Linux Initiative, Open-Source Contributor [View] *June 2024 −July 2024 [1 month]*

- Contributed to open-source Linux kernel (Ubuntu 22.04) to allow kernel cross-compile Rust loadable kernel modules.

Fast Raft: Hierarchical Consensus, Performance-Based Study [View] *Nov 2024 −Feb 2025 [3 month]*

- Developed the first gRPC-based implementation of the Fast Raft (vs Raft) hierarchical consensus algorithm in Go.

PROJECTS

FPGA-Based HFT Accelerator, Personal Project (modeled after MIT 6.111) *June 2025 −Present (Ongoing)*

- Custom open-source FPGA high-frequency trading accelerator, achieving sub-μs latency over NASDAQ ITCH.
- Pipelined architecture for real-time parsing, book-building, and MVP trading with scalable throughput.

Custom CPU with Speculative OoO Execution, Computer Architecture [View] *March 2025 −May 2025 [2 month]*

- Built a SystemVerilog CPU with speculative fetch, dynamic scheduling, reorder buffer, and in-order retirement.
- Achieved an average 33.2% speedup on SPEC-like benchmarks with robust handling of WAW hazards and data deps.

Yale Aerospace Association, CubeSat (Satellite) Lead Developer [View] *Sep 2023 - Jan 2024 [4 month]*

- Co-developed the core avionics system for a CubeSat 2U satellite planned to be deployed by NASA ISS.