Anton Melnychuk

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EDUCATION

Yale University, BSMS. Computer Science; Focus: EE & System Engineering *May 2026 (Junior)*

- **Relevant Coursework** († - Graduate Level): Principles of Computer System Design†, Building Distributed Systems†, System Programming and Computer Organization, Proof-Based Algorithms.
- **Incoming Coursework:** Computer Architecture†, Building Network Systems†, Circuits and Systems Design.

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

Hard skills: **Rust/C/C++;** Shell; Python, Go, Verilog, x86-asm, Express/ReactNative/React, MongoDB, git
Technologies: K8s, Docker; Linux; AWS/GCP, CI/CD, PyTorch & CUDA; OpenCV; RPC/HTTP, ASPICE, Omniverse
Languages: English (Fluent); Russian (Bilingual); Ukrainian (Native); Japanese (Advanced); Polish (Limited)

WORK EXPERIENCE

Embedded Developer *Sep 2024 - Present*
Iron Flight *San Francisco, USA*

- Volunteer to built AI-driven autonomous control systems for drones to protect freedom.
- Partitioned an object tracking DNN using Rust for drone-server distributed inference over UDP, optimizing performance by minimizing kernel-user boundary crossings and saving the company over $100,000 on hardware yearly.
- Developed protocols and modified STM32 flight controllers, boosting drone responsiveness in critical EW zones by 7%.

Operating Systems Research *Jan 2024 - Present*
Efficient Computing Lab

- Build and volunteerely redesigned in memory-safe Rust WeensyOS (detailed in projects), a tiny but real operating system used in 6+ US universities' core systems course to study kernel address space split and allocation techniques.
- Improved modularity in TheseusOS by shifting responsibilities to the Rust compiler by foregoing hardware privilege levels (e.g., x86's Ring 0-3), reaching 79% fault recovery over 800k+ injected faults with overheads at most 18%.
- Modified Linux kernel (Ubuntu 22.04) to cross-compile Rust loadable kernel modules, used for graduate-level course.
- Published an OS-verification cargo crate with 200+ daily downloads.

Computer Vision Research *Sep 2023 - Sep 2024 [13 month]*
Vision Lab

- Developed *generative physics AI* model for predicting short-term camera-occluded zone character walking trajectories.
- Built Isaac Sim OpenAI synthetic data generative pipeline gathering 80k+ labels for training.
- Led illicit pill classification project partnered with Swedish National Forensics labs.

Systems Developer *Sep 2023 - May 2024 [9 month]*
Yale Undergraduate Aerospace Association

- Assisted in the development of core avionics system partnered with NASA.
- Tested RTOS signals and logs; implemented satellite power distribution algorithm, reducing consumption by 45%.

PROJECTS

Pipelined RISC-V Processor Design, Custom CPU *Sep 2024 - Present (Ongoing)*

- Designed and implemented a 5-stage pipelined RISC-V processor in Verilog, supporting instructions like lw, addi, beq, and slt. Optimized the control path and memory modules, aiming to reduce instruction latency.

WeensyOS, Custom Operating System *May 2024 - July 2024 [3 month]*

- Transitioned a commonly used to teach OS to Rust, 95%+ reducing unsafe code (implements 15 unsafe blocks).
- Setup statically linked bootloader crate and developed custom GDT/IHM for Intel 8259 PIC, heap memory allocation, polling, and multitasking mechanisms. Implemented processes and a program loader to test Virtual Memory Map.