VITO GAMBERINI

Developer ~ Computer Engineer

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SUMMARY

Passionate about cross-domain digital systems engineering and performance applications. Formerly a submarine reactor operator with the U.S. Navy, experienced with high-speed, high-stakes engineering teams.

SKILLS

Languages: C++, C, Python, SystemVerilog, Bash, SQL, x86 Assembly, Javascript

Technologies: CMake, vcpkg, LLVM, Linux, Docker, GH Actions, Codecov, Verilator, npm, LaTeX

RECENT PROJECTS

E20 Binutils Suite (C++) **Proprietary**
Complete binutils suite for the E20 pedagogical machine language, including assembler, disassembler, linker, simulator, and debugger. Used by hundreds of students in the New York University Computer Architecture course each semester.

NYU Processor Design Build System (CMake / C++) **Github Link**
System for building, testing, generating coverage reports, and packaging SystemVerilog components. Adapts vcpkg and CMake to support a different language paradigm while seamlessly integrating with the Verilator C++ code generation tool.

Velocem (C / Python) **Github Link**
Current research project under active development, a hyperspeed Python web, development framework. Benchmarks as the second lowest latency Python application server implementation publicly available.

PurdNyUart (SystemVerilog) **Github Link**
Complete universal asynchronous receiver/transmitter design used as the initial bootstrapping interface for Purdue's AFTx07 chip. Features a novel digital baud rate generator, as well as 100% automated test coverage of the entire design.

EXPERIENCE

9/2021 – Present **Teaching Assistant** **NYU Tandon School of Engineering**
- Develop and present lecture materials on topics including intermediate-level C/C++ usage, processor instruction decoding, pipelining, speculative execution, and cache coherence protocols.

3/2014 – 6/2020 **Submarine Nuclear Reactor Operator** **United States Navy**
- Operated and maintained I&C systems directly involved with the primary reactor plant
- Maintenance Lead for the upgrade of primary reactor equipment. Developed operational, maintenance, and troubleshooting procedures for ten unique maintenance operations, completed dozens of non-routine testing operations, and supervised hundreds of routine maintenance tasks.

EDUCATION

9/2020 - Present **Computer Engineering, B.S.** **(expected grad. May 2024)** **NYU Tandon School of Engineering**
Relevant Coursework: Transistor Based Design, Operating Systems, Computer Architecture, Embedded Programming, Digital Logic & State Machine Design, Programming Languages & Implementation

5/2014 - 6/2016 **Electronics Technician, Nuclear Field** **Naval Nuclear Power Training Command**
Relevant Coursework: AC/DC Circuit Analysis, Transistor Theory, Digital Test Equipment, IC Maintenance & Repair, Receivers/Transmitters & Pulse Techniques

SELECT WRITINGS

Dec 2023 **Balm in GILead: Fast string construction for CPython extensions** **Article Link**
An unorthodox approach to optimizing Python C extensions that operate on Python strings. The described technique achieves a **5x** improvement on single-threaded benchmarks and up to a **20x** improvement on multi-threaded benchmarks.

Dec 2022 **Modern CMake Packaging: A Guide** **Article Link**
Complete guide to packaging facilities of modern CMake with a focus on correctness. Places an emphasis on understanding the mechanisms of packaging and discoverability instead of rote copy-pasting of build system boilerplate.

Jul 2022 **Upside Down Polymorphic Inheritance: Leveraging P2162 for Fun & Profit** **Article Link**
An introduction to the usage and applications of the C++20 feature that allows for inheriting from and extending `std::variant`. This enables value-semantics to be used in conjunction with closed-set polymorphic types.