Nikolas Varga

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EDUCATION

Northeastern University – Boston, MA   December 2025
Bachelor of Science in Electrical Engineering and Music
Honors: 3.9/4.0 GPA, Dean's List, Professor Arvin Grabel Memorial Scholarship
Relevant Courses: Embedded Audio Programming*, Introduction to ML*, Electronic Design, Fundamentals of Electromagnetics, Fundamentals of Linear Systems, Acoustics and Psychoacoustics, Digital Design, Fundamentals of Electronics, Circuits & Signals, Embedded Design, Calculus 3, Differential Equations and Linear Systems
Activities: Eta Kappa Nu, Tau Beta Pi, Generate Product Development, Northeastern Acoustical Society of America (President), Northeastern Music Department Student Advisory Board, Green Line Records

TECHNICAL SKILLS

Hardware: Analog Filter Design, Buck/Boost Converter Design, Digital Logic Design, Discrete-time PID, Function Generator, HIL Testing, Soldering, Sensor Integration, Oscilloscope, VNA
Software: Altium Designer, AutoCAD, Bash, C++, Embedded Systems, Git, KiCAD, LTSpice, MATLAB, NI LabVIEW, OpenCV, Python, RISC-V Assembly, SystemVerilog

EXPERIENCE

Harvard Medical School, Garner Lab – Boston, MA   July 2024 – December 2024
Computational Research Assistant
- Phase-matched 2 LEDs and 5 computer backlight signals to 2-photon laser sync signal to reduce 2-photon microscopy imaging noise by 100% using LabVIEW
- Designed 2-photon laser tracking system to maintain imaging location across experimental trials in LabVIEW
- Integrated LabVIEW auditory stimulus player with FSM, volume control, and buffer control with existing software, enabling place-preference tests in virtual 3D environments
- Applied cross-correlation processing techniques to analyze behavioral and auditory signals in MATLAB
- Refactored 3D rendering Python codebase to object-oriented architecture, implementing advanced features including 3D rotation, shearing, collision detection, and vector-based shape processing
- Studied auditory cognition and perception with interdisciplinary team of neuroscientists and engineers

Nano-C, Inc. – Westwood, MA   July 2023 – December 2023
Device Lab Research and Development Co-op
- Fabricated and tested over 100 solution-processed organic photovoltaic devices and thin-film transistors in sustainable materials science setting to improve efficiency for future devices
- Formulated new ink solutions to optimize device performance for indoor and outdoor lighting applications
- Streamlined Device Lab Python analysis tools using boxplot, regression, and dataset manipulation features, leading to more significant statistical analysis and decreasing analysis times by 50%

PROJECTS

Candlemaker – *Generate*   Spring 2025
- Designed ESP32 controlled heating system using Kapton heaters and power MOSFET to melt candle wax
- Detected system temperature using thermistor sensor, controlling heating signal duty cycle using discrete time PID
- Tested and tuned PID in C++, implementing mechanical engineers' constraints and reducing overshoots by 33%
- Layed out heat sensing and control PCB components in Altium

Tubender – *Generate*   Fall 2024
- Designed 5V and 12V buck converter filter and feedback networks to power subsystems efficiently
- Layed out 4-layer PCB with ESP32, flash/boot circuitry, TFT connectors, and differential signaling in KiCAD
- Wrote embedded C++ to track ticks of rotary encoder, control multiplexer, and address I2C GPIO expander
- Managed version control and project collaboration on GitHub, enabling deep team integration with branching

CMOS AM Radio Transmitter – *Fundamentals of Electronics*   Spring 2024
- Designed 3 inverter CMOS ring oscillator to generate a carrier signal with a partner
- Applied amplitude modulation of the carrier by attaching a 4th CMOS inverter with audio range signal source, successfully sending and receiving AM signal on open AM radio band

Hardware/Software Accelerometer – *Embedded Design*   Spring 2024
- Transmitted raw accelerometer data using memory mapped I/O and I2C serial communication
- Calculated and displayed angle calculation on 7 segment displays using FPGA digital logic design
- Collaborated to connect C++ software with FPGA hardware to read angle on Bash console

INTERESTS

Trumpet, music production, photography, DJing, urbanism, espresso making, social justice, bicycling

Single-Cycle RISC-V Processor – *Fundamentals of Digital Design*   Summer 2024
- Collaborated to design single-cycle processor in SystemVerilog implemented on Xilinx FPGA
- Designed instructions beqz, bnez, slli, srai, lw, and sw across ALU, PC, data memory, and register file
- Test-benched components to verify functionality as they were integrated into system

- Worked with cross-functional team of mechanical and electrical engineers to automate electrical conduit bending

- Attended twice-weekly stand-ups to refine objectives over 2-week sprints

MaxMSP, Ableton Live