

Ethan Khan

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EDUCATION

Binghamton University, State University of New York, Thomas J. Watson College of Engineering and Applied Science

Master of Science in Electrical Engineering - Physical Electronics & Electro-Optics

Expected May 2027

Cumulative GPA: 3.45/4.00

Relevant Coursework: Quantum Electronics & Photonics, Electro-Optics, Advanced Semiconductor Lasers, Analog Circuit Design, Hardware-Based Security, CMOS VLSI Circuits & Architecture

State University of New York Polytechnic Institute, College of Engineering

Bachelor of Science in Electrical Engineering

May 2025

Relevant Coursework: Optical Communication, Semiconductor Microfabrication, Embedded Systems, Control Systems, Microprocessors and CPU Architecture

TECHNICAL SKILLS

Languages: C, C++, Python, MATLAB, C#, VHDL, Verilog, CUDA

Software and OS: LTspice, Multisim, KiCad, Arduino IDE, AutoCAD, ROS2, NVIDIA Isaac Lab, Linux, Git/Github

Additional: Microcontrollers (Raspberry Pi, ARM-based), PID control systems, oscilloscope & bench-level debugging, semiconductor microfabrication (thermal oxidation)

PROFESSIONAL EXPERIENCE

Center for Safe and Secure Artificial Intelligence Robotics, Research Associate | Utica, NY *October 2024 – August 2025*

- Developed and tested AI-driven robotics systems on the NVIDIA Isaac stack, integrating perception and motion planning modules and validating behavior through defined test procedures.
- Profiled GPU workloads and inference to locate bottlenecks, improving computational throughput and power efficiency.

The Research Foundation for SUNY, Robotics Research Aide | Utica, NY

May 2024 – August 2024

- Built the motor-drive subsystem of an autonomous carrier robot using an L298N H-bridge with a dual-battery supply (separate motor and logic power), controlling DC motor speed and direction via Raspberry Pi PWM.
- Implemented PID closed-loop motor control and integrated a YOLO-based vision system that segmented the camera frame into directional zones for real-time person tracking and obstacle avoidance.

PROJECT EXPERIENCE

Constant-Current LED/Laser Driver Board, KiCad

June 2026 – Present

- Designing a regulated LM317 constant-current driver in KiCad that holds output constant independent of supply voltage.
- Extending from an LED load toward a protected laser-diode driver with current limiting and modulation.

8th-Order Sallen-Key Band-Pass Filter with Noise Rejection, LTSpice

August 2025 – December 2025

- Designed an 8th-order Sallen-Key band-pass filter (1 kHz-50 kHz passband, >45dB stopband attenuation) by cascading 4th-order high-pass and low-pass biquad stages, sizing RC networks (HP: 15.9 kΩ/10 nF; LP: 3.18 kΩ/1 nF) and setting stage gains ($K = 1.152, 2.235$).
- Analyzed loop stability by solving each biquad's pole locations, confirming all poles lie in the left half s-plane, and validated with transient step response that decayed without oscillations.
- Verified the design in LTspice with AC (1 Hz-10MHz) and transient simulation, recovering a clean 30 kHz tone from a white noise corrupted input.

CMOS Cascode Amplifier with Active Current-Source Load, LTSpice

October 2025

- Designed an NMOS cascode amplifier with an active current-source load achieving 86dB voltage gain and $\sim 7.2\text{M}\Omega$ output resistance, sizing devices at $W = 20\mu\text{m}$, $L = 1\mu\text{m}$ for a 1mA bias current.
- Hand Calculated transconductance ($g_m = 2.83\text{ mS}$) and output resistance ($r_o \approx 50\text{ k}\Omega$) from SPICE Level-1 model parameters ($K_P = 200\mu\text{A/V}^2$, $V_T = 1.0\text{ V}$, $V_{ov} = 0.707\text{ V}$), then verified gain and bandwidth against LTspice AC analysis (10 Hz – 100 MHz).

Semiconductor Experimentation Research Project, Team Member

January 2024 – May 2024

- Conducted research on thermal oxidation of silicon wafers, experimenting with impurity variables; presented findings showcasing the discovery of nanowire growth under specific conditions.
- Won second place award at the 2024 SUNY Polytechnic Student Project Showcase.

LEADERSHIP AND INVOLVEMENT

Residential Life SUNY Polytechnic Institute, Residential Advisor

May 2024 – May 2025

- Organized 6 community events (200+ participants) and advised 45 residents on academic and wellness resources.