

Ayan Ospan

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Education

The Pennsylvania State University

Aug 2024 – Dec 2027

B.S. Electrical Engineering, Minor in Engineering Entrepreneurship

GPA: 3.36/4.00

Relevant Coursework: Digital Logic Design (Verilog), Circuits & Devices, Signals & Systems, Embedded Firmware, Robotics Systems, MATLAB

Experience

Wabtec Corporation

Astana, Kazakhstan

Engineer Intern

Jun 2026 – Aug 2026

- Performed wire routing for ES44ACi auxiliary cabin electronic controls in Siemens NX; localized US locomotive hardware design to Kazakhstani specifications and locally sourced components in collaboration with Electrical Integration and Controls Engineers
- Identified and filed an approved Product Change Request correcting 3 erroneous helper's console harness callouts in official ES44ACi design documentation — proactively caught a hardware documentation error that would have caused incorrect assembly on production units
- Authored assembly instructions from scratch for the first-ever ES44ACi auxiliary cabin localization at LKZ, coordinating across technicians, sourcing, mechanical, and electrical integration engineers to capture the full assembly process

CASA-Goes Lab, Penn State

University Park, PA

Undergraduate Research Assistant

Jun 2025 – Present

- Implemented and tuned PID control algorithms using floating-point arithmetic for closed-loop trajectory tracking; integrated odometry, IMU, and camera data streams via sensor fusion for robust real-time state estimation
- Designed and executed 100+ controlled experiments to validate algorithm accuracy and stability under simulated sensor noise; systematically identified failure modes and improved trajectory stability by 28% through iterative numerical refinement
- Operated multi-process ROS node graph on Linux; managed real-time publisher/subscriber timing and inter-process communication in a concurrent execution environment

Projects

Real-Time Embedded Firmware — C, STM32 HAL, UART, PWM, SWO, GDB

Jan 2026 – Present

- Developed bare-metal firmware in C on STM32 NUCLEO-F411RE; implemented GPIO interrupt-driven control, hardware timer configuration, UART, and PWM with precise floating-point duty cycle computation at the register level
- Built SWO telemetry pipeline at 115200 baud for live hardware diagnostics under Linux; resolved 6 hardware-software interface bugs through systematic register-level debugging and failure mode analysis in GDB/STM32CubeIDE

FTC xCellece — Autonomous Competition Robot — Java, TensorFlow, Encoder/IMU Sensor Fusion 2023 – 2024

- Engineered full autonomous and teleop control stack: TensorFlow object detection pipeline, encoder/IMU sensor fusion for field localization, and floating-point PID trajectory control across an omnidirectional chassis
- Designed and integrated hardware-software interface for real-time motor control, servo actuation, color sensor input, and range sensing; won 1st Place at FTC Kazakhstan Regional and Innovation in Engineering Award at First Global Challenge

DKVS — Distributed Key-Value Store — C++20, CMake, Linux

Jun 2026 – Present

- Building a distributed key-value store from scratch in C++20 on Linux; strictly layered architecture separating KVStore (in-memory `std::unordered_map`), command handling, and TCP networking — designed for incremental extension through sharding, replication, and fault tolerance phases

Awards & Recognition

1st Place — FTC Kazakhstan Regional (2024) **Innovation in Engineering Award** — First Global Challenge (2024)

Top 3 / 80+ — WRO Kazakhstan National (2023)

Technical Skills

Languages: C/C++ (C++20), Verilog, Python, Java, MATLAB

Hardware: STM32 HAL, Siemens NX (wire routing/CAD), GPIO, UART, PWM, SWO, Embedded Systems

Tools: GDB, CMake, Linux, ROS, Git, GitHub Actions

Concepts: Digital Logic Design, PID Control, Sensor Fusion, Register-Level Debugging, Real-Time Systems