

Zihan Zhao

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EDUCATION

The Pennsylvania State University, College of Engineering

August 2023 – May 2027

Bachelor of Science in Computer Science Minor: Computer Engineering

Cumulative GPA: 3.80 / 4.00 | Dean's List: All Semesters

EXPERIENCE

Advanced Vehicle Team

August 2026 – Present

Embedded Software Engineer | State College, PA

- Develop embedded perception and control pipelines for autonomous vehicles, fusing multi-sensor data—LiDAR, cameras, and GPS—and performing system integration on edge computing hardware using ROS, C++, and Python.

The Pennsylvania State University

August 2026 – Present

Learning Assistant, Computer Networks (CMPEN/EE 362) | State College, PA

- Grade weekly problem sets and assignments covering the Internet protocol stack—transport layer (TCP/UDP, congestion control), network layer (IP addressing, routing, SDN), and link layer—providing detailed feedback for the class.

The Daily Collegian

September 2025 – August 2026

Back End Developer | State College, PA

- Built a unified RESTful API backend in Node.js/Express integrating the Facebook Graph API, X API v2, and Instagram API, enabling centralized collection and analysis of social media data across all three platforms.
- Implemented OAuth 1.0a user-context authentication for the X platform, unlocking native engagement metrics (including impressions) beyond standard API tier limits.
- Designed a unified router architecture spanning account info, post-level statistics, and user interaction data, improving scalability and maintainability of the service.

LANXIN Technology

June 2025 – August 2025

Software Engineering Summer Intern | China

- Built a Java-based inertial navigation simulation platform for high-speed trains: multi-threaded IMU/GPS sensor emulation with configurable noise, drift, and output frequency (ScheduledExecutorService), plus a real-time Swing GUI for live parameter control and data visualization.

RESEARCH

Wearable Sleep-Staging Research (Penn State MC-REU, funded 2025 & 2026)

February 2025 – Present

Undergraduate Researcher | University Park, PA

- First-author manuscript in preparation on 3-class sleep staging (Wake/NREM/REM) from wrist accelerometry, evaluated against polysomnography; targeted journal submission October 2026.
- Engineered an end-to-end ML pipeline pooling 3 public datasets across 2 devices (Apple Watch, Empatica E4) and 3 populations—219 participants, 190,793 30-second epochs—with SHA-256-frozen data pools for reproducibility.
- Extracted 98 accelerometry features and trained XGBoost/AdaBoost classifiers with Hyperopt TPE tuning; evaluated via grouped nested cross-validation with macro-F1, class-specific sensitivity/specificity, Cohen's κ , and Bland-Altman analysis; earlier two-stage pipeline reached 88.7% balanced accuracy on sleep/wake classification.
- Diagnosed cross-device “shortcut learning”: traced feature-scale anomalies to 8-bit sensor quantization, showing the pooled model could identify the source device at AUC $\approx$ 1.0; quantified mitigation trade-offs (–6.5% macro-F1) to guide domain-adaptation strategy.

PROJECTS

PolarVision — Polarized Optical Inspection System (GitHub)

Summer 2026

- Built a real-time desktop application (Python, OpenCV, PyQt5) detecting micro-cracks and residual stress in glass via crossed-polarizer imaging: CLAHE enhancement, Canny edge extraction, morphological filtering, and skeleton-based 12-dimension feature extraction feeding an interpretable risk-grading model.
- Optimized the vision pipeline to ~65 ms/frame at 640×480 (5–10× faster filtering, C++ skeletonization, frame skipping) for smooth 15 fps operation on low-spec laptops; added USB camera hot-plug enumeration with automatic device preference.
- Packaged and shipped a standalone Windows executable with PyInstaller, including a CLI for offline batch processing and automated PNG/JSON report generation.

TECHNICAL SKILLS

Languages: Python, C, C++, Java, JavaScript (Node.js), SQL, Verilog

Frameworks & Tools: Express, ROS, OpenCV, PyQt5, XGBoost, Hyperopt, Git, Linux, PyInstaller, REST APIs, OAuth, Digital Circuit Design

Certifications: Supervised Machine Learning: Regression and Classification; Advanced Learning Algorithms