# Andrew Dalbins

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## Education

**Arizona State University** May 2026
*Bachelor of Science in Computer Engineering* *Current GPA: 3.70/4.00*

## Projects

**FPGA Machine Learning Accelerator** | *Verilog, Python, Vivado*

- Designed a matrix multiplication accelerator in Verilog to speed up core deep learning operations
- Utilized Vivado for synthesis, timing analysis, and resource utilization tracking
- Achieved 80% performance gains compared to a CPU-based reference solution
- Validated system reliability and accuracy using a suite of test matrices and simulation scripts

**Real-Time Air Quality Monitoring System** | *C/C++, FreeRTOS*

- Deployed FreeRTOS on the ESP32 to manage sensor data, signal processing, and display updates in real time
- Integrated an Adafruit BME688 sensor (temperature, humidity, gas) via I2C for continuous air quality readings
- Displayed real-time measurements on an LCD module and logged data for analysis
- Ensured stable operation by assigning proper task priorities and using queues for inter-task communication

**LED Matrix Music Visualizer** | *C/C++, KiCad*

- Designed a 16×16 LED matrix PCB in KiCad, ensuring optimal component layout and signal integrity
- Programmed the STM32 microcontroller in C for real-time audio processing and LED animation control
- Implemented a microphone input to capture ambient sound and drive reactive lighting patterns
- Optimized the board for low power usage and smooth visual transitions

**Face Tracking Sentry System** | *Python, OpenCV*

- Developed a real-time face tracking system on Raspberry Pi 5, leveraging Hailo-8 AI acceleration module
- Integrated camera module with YOLOv5 and OpenCV to detect faces with low latency at 20 FPS
- Implemented servo motor control for automatic tracking, keeping subjects always centered
- Designed a modular code structure for easy feature expansion (alerts, facial recognition)

## Experience

**Machine Learning Engineer** June 2023 – January 2024
*ELKO Group* *Berlin, Germany*

- Built a product recommendation engine using a custom deep learning model on Microsoft Azure
- Created a data pipeline for preprocessing, retraining, and integration into a Django backend
- Monitored key metrics and fine-tuned the model to boost repeat customer sales by 18%
- Collaborated with cross-functional teams to ensure seamless deployment and scalability

**Undergraduate Research Assistant** December 2022 – May 2023
*University of Latvia* *Riga, Latvia*

- Tested multiple data augmentation strategies for Convolutional Neural Networks (CNNs)
- Compiled a custom dataset using Pandas and optimized large-scale image preprocessing
- Developed CNN models in Keras/TensorFlow with systematic hyperparameter tuning
- Improved classification accuracy by 25% through iterative experimentation and analysis

## Technical Skills

**Languages**: C/C++, Assembly, Verilog, Python, Java, MATLAB
**Toolkits & Software**: FreeRTOS, TensorFlow, OpenCV, Vivado, KiCad, Docker, Git
**Lab Equipment**: Oscilloscope, Logic Analyzer, Function Generator, DC Power Supply
**Protocols & Hardware**: I2C, SPI, UART, Nexys A7-100T, ESP32, STM32