# OMPRAKASH INDLA

**Embedded Systems Engineer**

205-422-2685 | oindla@uab.edu | Birmingham, AL | linkedin.com/

## CAREER SUMMARY

I am a graduate student in Electrical & Computer Engineering with practical experience in embedded electronics, sensor-driven systems, real-time firmware, and hardware validation. Solid experience in electronic control systems, data collection, HIL-style testing, and MATLAB-driven data analysis, with expertise in assisting safety-critical automotive and industrial applications. Enthusiastic about applying theoretical knowledge from the classroom to practical engineering solutions through evaluation, verification, and documentation

## TECHNICAL SKILLS

FreeRTOS, ARM Cortex-M (STM32, ESP32), Embedded C & C++, Sensor implementation & calibration, ADC & DMA, CAN communication & troubleshooting, UART, SPI, I2C, hardware-software integration, hardware-in-loop (HIL) testing, MATLAB data analysis, Python scripting & automation, electronics lab tools, system validation & debugging, and technical documentation.

## PROJECTS

**Real-Time Motor Control & Safety-Critical RTOS Simulator**

Embedded C, FreeRTOS (Win32), ARM Cortex-M Architecture

- A deterministic real-time closed-loop motor control simulator with interrupt-driven timing and priority-based task management was created using FreeRTOS.
- Using fixed-point arithmetic, PID control was created with guaranteed finite execution times.
- Developed fault detection systems that include secure state transitions, task starvation oversight, overcurrent, and sensor malfunction.
- Developed recovery and monitoring oversight algorithms to simulate runtime error and brownout situations. Worst-case execution checks and timing evaluation were carried out to ensure consistent behavior when multitasking.

---

**Automotive CAN Bus Network & Fault Injection Framework**

Embedded C, Python, Linux SocketCAN

- Designed and implemented a multi-node CAN network simulator that replicates ECU behavior through bus load analysis, message priority, and arbitration.
- Added deterministic retransmission logic, bus-off recovery, and error frame creation.
- A diagnostic tool for real-time message decoding, logging, and latency monitoring was developed using Python.
- An automated fault injection system was developed to assess resilience in the presence of severe bus congestion and malformed frames.
- In accordance with automobile electronic system standards, protocol-level validation was carried out.

---

**Lithium-Ion Battery Digital Twin & State Estimation Engine**

Embedded C, FreeRTOS, Python Visualization

- Developed a multi-node CAN network simulator that simulates ECU operations, including bus load assessment, message prioritizing, and arbitration.
- Developed predictable retransmission techniques, error frame generation, and bus-off recovery algorithms.
- Developed a Python diagnostic tool for real-time message decoding, latency measurement, and logging.
- To evaluate robustness against substantial bus congestion and malformed frames, an automated fault injection mechanism was developed.
- Performed protocol-level validation in compliance with requirements for automotive electronic systems.

---

## PROFESSIONAL EXPERIENCE

**HARDWARE ENGINEER (ENGINEERING VOYAGER)** | **Marriott international** | Mumbai, India Jul 2023 – May 2024

- Assisted in the operation and validation of mechanical and electrical systems throughout the hotel, including HVAC units, chilled water systems, pumps, VFDs, and building automation controls to ensure stable environmental performance and uphold guest comfort standards.
- Enhanced the reliability of HVAC electronic controls by boosting system uptime by 10% through sensor recalibration, signal integrity checks, and validation of closed-loop control under different load and occupancy scenarios.

- Conducted systematic diagnostics on sensors for temperature, pressure, and airflow; confirmed the behavior of analog/digital signals, actuator responses, and the stability of control setpoints to guarantee reliable system performance.
- Reviewed Building Automation System (BAS) trend logs and utility metrics; created Python-based data analysis and visualization tools to identify control drift, unusual cycling, and inefficiencies, leading to a 15% decrease in energy usage.
- Performed root-cause analysis of electrical and control issues, documenting edge-case behaviors and applying corrective measures in accordance with preventive maintenance and Marriott engineering standards.
- Contributed to commissioning, validating system tests, and coordinating with vendors during equipment upgrades and modifications to the control system.
- Executed Lockout/Tagout (LOTO) safety measures and organized documentation methods to guarantee compliance, accountability, and operational dependability

**SOFTWARE ENGINEER INTERN** | **GTT Communications** | Pune, India Jan 2023 – Jun 2023

- By developing Python-driven automation tools for log aggregation, anomaly detection, and performance trend analysis across distributed network services, the efficacy of system monitoring increased by 20%.
- To reduce the amount of human troubleshooting, structured log parsing and warning systems were developed to identify latency increases, packet losses, and anomalies in resource utilization.
- By running regression test suites and assessing system-level performance under simulated load situations, I helped verify firmware and hardware-software integration.
- Developed and put into practice structured test cases that adhered to functional specifications, recording problems, their root causes, and the results of solutions to improve traceability and release assurance.
- To increase system visibility during validation and speed up issue discovery and inter-team debugging collaboration, simplified diagnostic and telemetry tools were developed.
- Participated in performance benchmarking projects that assessed response time, memory use, and throughput under pressure.

## EDUCATION

**MASTER'S DEGREE** | Electrical & Computer Engineering | University of Alabama at Birmingham 2024 – 2026
**BACHELOR'S DEGREE** | Electronics and telecommunication engineering | Symbiosis Institute of Technology 2019 – 2023