# <u>Anthony Ibarra</u>
## Embedded & Control Systems Engineer
(Chicago, IL; Available to Start Onsite)

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## <u>Professional Summary:</u>

Electrical and Computer Engineering graduate looking for the opportunity to become a professional in my respective field. Showcasing a strong focus in Embedded Systems, and Control Systems Theory. With fundamental understanding of pattern recognition, Signal processing, and power electronics making me a flexible Embedded & Control Systems Engineer. Possessing various knowledge in related fields providing fast adaptable capability within the work environment of a multidisciplinary team. With the eagerness to learn on and off the job, demonstrating reliability and trustworthiness for a great addition toward an Embedded Engineering team.

## <u>Education:</u>

**University of Illinois Chicago (UIC)**                                              **Jan 2023 - May 2025**

Master of Science in Electrical and Computer Engineering Chicago, United States

### Relevant Coursework:

- Linear Systems Theory & Design, Convex Optimization, Adaptive Digital Filters, Mechatronics Embedded Design
- Audio & Acoustic Signal Processing, Filter Synthesis, Electromechanical Energy Conversion
- Electromagnetic Compatibility, Neural Networks, Advanced Computer Communication

**University of Illinois Chicago (UIC)**                                              **Aug 2017 - May 2022**

Bachelor of Science in Computer Engineering Chicago, United States

### Relevant Coursework:

- Embedded Systems, Principles of Modern Control, Principles of Auto Control, Robotics Algorithm and Control
- Pattern Recognition, Computer Comm Networks, Artificial Intelligence

## <u>Certifications:</u>

- C Programming for Embedded Applications - LinkedIn Learning
- Introduction to FreeRTOS and Basic Task Management - LinkedIn Learning
- Learning LabVIEW - LinkedIn Learning
- Data Acquisition with LabVIEW - LinkedIn Learning
- Learning FPGA Development - LinkedIn Learning
- Learning Verilog for FPGA Development - LinkedIn Learning
- Getting Started with RISC-V - LinkedIn Learning
- Creating and Securing Bluetooth Low Energy (BLE) Application - LinkedIn Learning
- Satellite Internet and Communications: Fundamentals - LinkedIn Learning

## <u>Professional Experience:</u>

**Bootloader & Firmware Updater**                                              **Nov 2025 – Nov 2025**
**Project, Blinky to Bootloader: Bare Metal Programming Course**

- Implementing AES Firmware CBC_MAC mechanism, and the signing and validation processes
- Bootloader and Firmware Updater implementation through a state machine and timeout implementation
- Implement the system teardown and system setup
- Flash Control the process of writing to the flash and erasing the main application when updating
- UART packet implementation, full UART driver interface with race conditions prevention via Ring-buffer, implement NACK, ACK and the CRC for the packet integrity confirmation

**MINI RTOS; Quantum Leaps, LLC**                                              **Oct 2025 – Oct 2025**
**Project, Modern Embedded Systems Programming Course**

- Build a basic RTOS implementation in Embedded C for a TIVA C microcontroller
- Automating the context switch, and the scheduling for the round-robin policy
- Efficient blocking for threads and preemptive/priority-based scheduling
- Using QXK RTOS kernel for more advanced use cases:
- Synchronization and communication among concurrent threads
- Mutual exclusion mechanisms

**University of Illinois Chicago (UIC) Chicago, United States**                    **Jan 2025 – May 2025**
**Research Project, Acoustic & Audio Signal Processing**

- Implement a solution for motorcycle riders with some degree of hearing impairment.

- The starting goal is to remove the dampening from the helmet, providing clear sound while wearing the helmet without adding any unneeded noise or unwanted sounds.
- In turn this can potentially amplify user awareness while riding or in largely populated areas. Report being in the scope and style of a Signal Processing Society conference paper.
- Develop a new method or solution with concepts to be applied to an existing problem.
- Perform real world testing and validation of project and research implementation.
- Test and use skills and algorithms from acoustic & audio signal processing to achieve the set goal

**University of Illinois Chicago (UIC) Chicago, United States**                    **Jan 2023 - May 2023**
**Self-Driving Car, Mechatronics Embedded Design**
- Lead the team and manage all time constraint tasks, development and design tasks, make timely decisions for the team's success in completing the product and hardware development
- Design a motor driver circuit through FET Driver implementation, either of (single fet, half bridge, or full H-bridge), controlled via a PWM input signal from the microcontroller
- Design a Boost Converter for the implementation multiple power systems
- Product testing using Oscilloscope, multimeters, benchtop powersupplies; and Soldering fixes when necessary
- Develop and tune PID controllers for both the steering and velocity controls (Servo motor, DC motor) respectively
- Design, develop the PCB through Altium Designer and get it manufactured, providing all necessary files such as BOM, gerber files, etc.
- Solder all through hole and SMT components including masking for PCB and Prototype; create any needed jumper wires for connections through crimping and soldering
- Prototype implementation of a perf board circuit, also used as an emergency backup board for PCB failure ensuring continuation of product development
- Implement Sensors and Encoders a filter for the line Camera or velocity measured input through embedded software development and test through debugging microcontroller software

**University of Illinois Chicago (UIC) Chicago, United States**                    **Aug 2021 - May 2022**
**Automated Watering Systems, Senior Design Product Development**
- Work in a four-student team to prototype a product implementing a automated watering systems plants by taking moisture levels, outdoor weather conditions, and plant information data into account
- Manage team through verbal and written communication to make sure all assignments and goals are completed on time, and submit weekly reports based on progress of project development
- Embedded programming for a Arduino Nano iot 33 to consider watering decisions per plants moisture levels and water consumption
- Create mobile APP (Kivy framework) to display necessary information regarding the system, plants moisture levels and weather conditions
- Create a UDP client-server connection for communication between powered product and the mobile application; providing manual control over a wireless connection
- Implement wireless communication through Bluetooth Protocol (BLE) for consumer and their device

**Languages:**
- Spanish (B-1) English (Advanced)


**Skills:**
**Embedded Concepts:** RTOS(mutex, semaphores,priority queues), Baremetal, Embedded C/C++, State Machines
**Testing:** Pytest, Utest, Test Driven Development, Unit Testing, Tracing, Debugging,HIL
**Programming Languages:** C, C++, RTOS, Python, Bash, MIPS Assembly, ARM, FPGA, Verilog, VHDL
**Protocols:** BLE, UDP, TCP/IP, I2C, UART, SPI, Ethernet, RF, LTE, Boot Loader implementation, Driver development
**Microcontrollers/SoCs:** Texas Instrument Tiva C, Freescale, Raspberry PI, Arduino Nano
**IDEs:** Code Composer Studio, keil UVision, STM32 CubeMX, Arduino IDE, PlatformIO,VSCode
        MATLAB, Simulink, Quartus, Wireshark,  Icarus Verilog
**Version Control:** Git, GitHub, Docker, Ubuntu, MySQL
**Hardware Tools:** Oscilloscope, Multimeter, Soldering iron, RF Analyzer(FieldFox)
**Other:** ROS2