Jorge Alejandro Gonzalez Diaz

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Education

Tecnologico de Monterrey (ITESM) Guadalajara, Mexico

B.S. in Robotics and Digital Systems Engineering | *Detailed course list* *Aug. 2022 – June 2026*

GPA: 94.2/100 - Academic Excellence Scholarship

Relevant Courses: Computer Organization, Data Structures and Algorithms, Object-Oriented Programming, Embedded Systems, RTOS, Circuit Design, Programmable Logic, Operating Systems.

Work Experience

Shell Eco Marathon - ELYOS Team | *C, ARM Toolchain, CMake, Altium [GitHub]* *Nov. 2022 – Present*

- Developed a **BLCD power motor controller** which focuses in energy efficiency within an electric vehicle.
- Implemented efficient controller algorithms using the ARM based **RP2040 Raspberry Pi Pico**.
- Designed and programmed an **STM32** based **telemetry system** to capture data from the track and receive it through **LoRa** technology, along with a dedicated Graphical User Interface (GUI) built with **QT Quick**. *[Flux]*
- Developing **Field Oriented Control (FOC)** algorithm to enhance motor performance and overall efficiency.
- Participated in Shell Eco Marathon Americas 2024 in EV category with a result of 302.1 km/kWh and obtained **fourth place** out of 28 teams, setting a new **record for Mexican teams** within the competition.

Projects

Evaluation of Advanced Driver Assistance Systems | *Python, OpenCV, Git. [GitHub]* *Oct. 2023*

- Developed image analysis algorithms leveraging **OpenCV**, which include cross correlation for centering detection, **MTF50** for focus evaluation, and pixel brightness to evaluate orientation and image luminosity.
- Obtained **first place** in Bosch Vision.io Hackaton.

PCB AutoInspect | *C, MCUXpresso, Git [GitHub]* *Mar. - June 2024*

- Developed an **automatic PCB Inspector** using an **NXP KL25Z** board together with a **Raspberry Pi 4** for image processing with an RGB camera.
- **Bare metal programming** to allow **manual and automatic** operation of a CNC type mechanism based on user input with KL25Z as the main hardware controller.
- Managed board communication and synchronization via **UART** messaging.

ARM Microcontroller | *Verilog, Altera Quartus, Git [GitHub]* *May - June 2024*

- Implemented a 32-bit ARM based microcontroller using Verilog.
- Built a **3 stage pipeline** (fetch, decode, execute) embedded in a control unit module, a **Harvard style** memory organization, an **Arithmetic Logic Unit (ALU)**, register file consisting of 15 general purpose registers along with a program counter and status register.

Awards

Premio Silvia Torres Physics Contest 2022

- Obtained first place in *Premio Silvia Torres* mathematics and physics contest organized by Universidad de Colima, Mexico. [Link]

Technical Skills

Languages: C, C++, C#, Python, Matlab, SQL, JavaScript, QML, Verilog, R (basic)
Developer Tools: Git, GitHub, Docker, FPGA, Intel Quartus, QTQuick
Design Tools: SolidWorks, Altium Designer, Flux