


# LUIS FABREGAS

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 Hamilton, ON

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 [LuisFabregas](https://github.com/LuisFabregas)

## PROFESSIONAL SUMMARY

- Knowledge in **Python** and **JavaScript** Frameworks and core languages of web development acquired through personal projects, extracurriculars and work experience
- Excellent written and verbal communication skills developed while working as a Teaching Assistant for McMaster University
- Strong organization and time management skills gained through participation in extracurricular activities
- Strengthened leadership and teamwork experience gained by working on multiple group projects to design and develop complex electrical systems

## EDUCATION

### Bachelor of Engineering, Electrical Engineering

September 2018 – April 2024 | McMaster University, Hamilton ON

#### Relevant Coursework:

- Enrolled in level 5 of 5-year Electrical Engineering Co-op program with a minor in computer science
- Demonstrated circuit theory by implementing and analyzing circuits through **oscilloscopes and multimeters** during the circuitry labs (Introduction to Electrical Engineering A-)
- Automated processes in **UNIX** by developing bash scripts to open, write, and read files, execute subroutines, and validate command-line arguments (CS Pract & Exp: Software Development A+)
- Learned about the design of a relational database, and used the standard **SQL** data manipulation language to load data into tables, manipulate data and retrieve desired data records (Databases A-)
- Programmed elementary **data structures** (such as lists, stacks, queues, etc) in Java and estimated the performance of each algorithm using asymptotic time and space complexity analysis. (Data Structures, Algorithms and Discrete Mathematics B)
- Created execution tables for several DAXPY loop iterations using Dynamic-Scheduling on a multi-threaded machine and multiple-issue machine requiring knowledge of **RISC/CISC architectures**, instruction set design, pipelining, and scheduling (Computer Architecture B+)
- Created a 4x4 RAM using logic gates and latches and developed **logic-based circuits** through Altera Quartus (Logic Design B+)
- Analyzed, modeled, and predicted the performance of **energy conversion** devices and systems including balanced three-phase systems for Induction Machines, Induction Motors, Transformers, and Synchronous Generators (Energy Conversion A)
- Investigated the issue of aliasing when analog signals are sampled using the discrete and fast Fourier transform through labs in **MATLAB** by simulating signal sampling in a digital telephone network (signals & systems A+)
- Developed a MATLAB program for modulating and demodulating discrete time signals utilizing DSBSC and QAM techniques and assessed their performance by adding AWGN. This allowed me to optimize the system for improved reliability by identifying the modulation techniques' susceptibility to noise. (Communication systems A+)

- Gained the skills necessary to apply probabilistic techniques such as hypothesis testing, data analysis, statistical inference, and linear regression in a variety of complex engineering type problems. (Probability and Statistics for Engineering A-)
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## WORK EXPERIENCE

### Lab Development Technician

May 2023 – August 2023 | McMaster University, Hamilton ON

- Utilized OPAL-RT Hardware, HYPERSIM software, **voltage/current amplifier** and a feeder protection **relay** to develop interactive laboratory exercises for students, enabling them to gain hands-on experience in Rapid Control Prototyping and Hardware-in-the-loop simulation.
- Created comprehensive instructional manual for HYPERSIM and OPAL-RT, providing clear and concise guidance on utilizing the software and hardware for analyzing and validating transient electromagnetic phenomena in power system circuits.
- Designed, and implemented complex **power systems** using HYPERSIM to optimize system performance and stability, while conducting extensive **Hardware-in-the-Loop (HIL)** testing with OPAL-RT hardware to validate the functionality and reliability of power grid protection systems.

### Software Developer

May 2021 – August 2022 | Evertz Microsystems LTD, Burlington, ON

- Assumed lead role in the development of the [evertz.io](https://evertz.io) website, increasing sales of the cloud service by 20% in a six-month period
- Used **Angular** to implement and improve the user interface for the company's cloud-based products which resulted in the creation of a loyal customer basis.
- Reduced the number of customer complaints by 5% by building extensive test coverage using **Jest** for all new features
- Experience with **agile** methodologies gained through collaboration with scrum team to plan milestones, successfully execute software delivery, and escalate issues as needed
- Effectively managed multiple coding projects, consistently meeting tight 2-week project deadlines while ensuring top-quality work output

### Teaching Assistant (C++ Programming)

September 2022 – April 2022 & June 2023 – July 2023 | McMaster University, Hamilton ON

- Utilized comprehensive knowledge of **object-oriented programming** principles and concepts to provide clear explanations and helpful feedback to students on their coursework
  - Demonstrated excellent **time management** skills by meeting tight one-week deadlines for grading and providing feedback to over 30 students on their laboratory work and assignments, while also having a full-time academic workload
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## EXTRACURRICULAR ACTIVITIES

### Vice President Academic

September 2022 – September 2023 | McMaster Electrical and Computer Engineering Society (ECES), Hamilton, ON

- Showcased exceptional **organizational skills** by coordinating and scheduling review sessions for multiple electrical courses, ensuring timely and effective preparation for exams.
- Developed and executed comprehensive review sessions for multiple electrical courses, demonstrating a strong understanding of the course content and the ability to synthesize complex concepts into easily digestible information for students.

### Web Developer

August 2020 – April 2022 | McMaster Sumobots, Hamilton ON

- Worked with 5 team leads to gather and define requirements for the design of the [McMasterSumobots](#) website and created wireframes using **figma** based on those requirements
- Developed a dynamic and interactive website using the modern JavaScript framework **Vue.js** that ensured high traffic, page-views and user experience, resulting in a 10% increase in student participation
- Collaborated with 2 other web developers using version control software **Git** and code repository **Gitlab**

### Student Mentor

January 2020 – February 2022 | Stem Hacks, Hamilton ON

- Assisted and instructed kids on how to code in python and build an autonomous car using an Arduino
- Marked and judged kids' program to decide the winner of the event

## PROJECT EXPERIENCE

### Autonomous Electric Vehicle (AEV)

January 2023 – April 2023 | Electrical Systems Integration Project

- Worked in a group of 3 to Integrate knowledge from across multiple areas of the electrical engineering discipline including electric drive systems, robotics, control systems, and optimization to develop an autonomous electric vehicle
- Used the principles of the **Robot Operating System (ROS)** to develop and implement a real-time control system on Nvidia Jetson Nano AI embedded computer
- Conducted thorough analysis of magnetic and electrical characteristics of the electric motor drive under diverse operational conditions, utilizing the data to optimize motor performance.
- Demonstrated expertise in implementing **simultaneous mapping and localization (SLAM)** techniques by integrating LiDAR scan data, VESC-based wheel odometry, and IMU measurements to simultaneously map the vehicle environment and accurately localize the vehicle within it.
- Developed and implemented autonomous driving algorithms that allow the vehicle to operate in a range of scenarios from manual driving with driver-assist, to fully autonomous driving.

### Wilkinson Power Divider

September 2022 – December 2022 | Devices & Antennas: Wireless Systems

- Designed the Wilkinson Power Divider to divide the incoming signal into 2 equal parts by using even-odd analysis to determine the characteristic impedance and the physical constraints of the transmission lines
- Fabricated the device by **soldering** microstrips and the SMA connectors to the circuit board and used a **multimeter** to check if soldering connections were satisfactory
- Measured the performance of the device using **VNAs** and presented the S-parameter data in a report illustrating the discrepancies that could have appeared in the device

## Pacemaker

September 2020 – December 2020 | Software Development

- Worked in a group of 5 to replicate the functionality of a pacemaker using a FRDM K64F board
- Modeled the different states of a pacemaker to optimize, verify, and validate the overall system design by testing the embedded system in a simulation environment (in this case **Simulink**).
- Created a user interface using **Python** and QT Creator. Allowing the user to change the mode of the pacemaker and various parameters, as well as display an electrogram of the atrial and ventricle signals.
- Documented the software development lifecycle specifying the requirements, design decisions, testing, and anticipated changes to requirements and design.

## Full Stack Developer

June 2020 – July 2020 | Portfolio

- Developed and designed the front-end of the portfolio using **HTML**, **CSS**, and Bootstrap in a **Linux** based environment
- Used the **Python** based framework Django as the back end so users can easily add and remove project information through the Django admin panel
- Integrated **JavaScript** and **jQuery** to create an interactive web application that improves the functionality of the website and user experience
- Stored the data of my website using **AWS S3** buckets and used **Heroku** to deploy it

## Embedded Time of Flight Sensor

January 2020 – March 2020 | Microprocessor Systems Project

- Constructed an embedded system that utilized a microcontroller, a time-of-flight sensor, and a stepper motor to create a **3D model** of your environment
- Programmed the embedded system in **C based assembly** to rotate the stepper motor and collect the spatial data around the embedded system using the time-of-flight sensor when a button is pressed
- Transferred the data from the microcontroller to a PC (using a simple **UART program**) so it can be visualized in programs such as MeshLab.

## Prosthetic Hand

September 2018 – December 2018 | Engineering Design & Graphics

- Designed and developed a full-right-hand prosthesis, with the opening-and-closing of the fingers and thumb being driven by a gearing mechanism that connects to a single motor
- Modeled the gears, hand frame and fingers, assembled the mechanism and validated my design using **Autodesk Inventor**
- Utilized a high level of attention to detail to construct **engineering drawings** of gear trains for prosthetic hand that are in accordance with ANSI Standards

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## SKILLS

**Laboratory:** Oscilloscope Digital Multimeter Soldering WHMIS Certified 3D Printing

**Technical:** C++ Javascript Python Bash GIT Linux MATLAB Simulink Jira Confluence  
Quartus II SQL Java C Autodesk Inventor HTML5 CSS Django Angular Vue