

## Brandon Joel Gonzalez – Curriculum Vitae

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### Career Objectives

Interested in the development and innovation of electronics engineering and related fields. Beginning a doctorate in electrical engineering, starting in Fall 2021, with a long-term goal of working in teaching and research at a university. Love of learning, teaching, and helping guide others to their fullest potential.

### Education

#### **Carnegie Mellon University – College of Engineering**

- ❖ Ph.D Student in **Electrical and Computer Engineering** – Entering Fall 2021
  - Research Advisor: Dr. L. R. Carley
  - Research Interests: electronics design; embedded systems; mechatronics

#### **University of Pennsylvania – School of Engineering and Applied Science (SEAS)**

- ❖ M.S.E. in **Robotics** – Spring 2021 – GPA: 3.46/4.00
  - Master's Thesis: "Exploring the Development of Novel Sensor Systems for Human Occupancy Detection"
    - Advisors: Dr. Camillo Jose Taylor of [GRASP](#) and Dr. Madhu Annapragada of [Automation Research Group](#)
    - Began in June 2020 and presented in May 2021
- ❖ B.S.E. in **Computer Science**, minor in **Mathematics** – Fall 2019 – GPA: 3.54/4.00 – **Cum Laude**
  - Senior Project: [TeaBot](#)
    - Advisor: Dr. Camillo Jose Taylor
    - Began in August 2018 and presented in May 2019

### Teaching Experience

#### **UPenn SEAS – CIS/ESE Teaching Assistant**

- ❖ TA for the Department of Computer and Information Science (CIS) & Department of Electrical and Systems Engineering (ESE)
- ❖ Responsibilities include: lecturing, recitations, lab and review sessions, lab and office hours, explanation videos, forum monitoring, staff meetings, grading, project advising, development of course labs, projects, and curricula
- ❖ Semesters as head TA denoted with \* and semesters online denoted with ^
- ❖ TA history:
  - CIS240/CIT593: **Introduction to Computer Systems** – Fall 2018, Spring 2019, Summer 2019^
    - Introductory systems course covering topics from CMOS logic gates to architecture design to operating systems programming
  - CIS380/548/CIT595: **Operating Systems** – Fall 2019, Spring 2020\*, Summer 2020\*^
    - Advanced course exploring design and implementation of operating systems, primarily Unix-based, in the C programming language
  - CIS371/501: **Computer Architecture** – Fall 2019, Spring 2020^
    - Advanced course exploring design and optimization techniques in modern computer architecture, with labs in Verilog

- ESE190/M&TSI: **Introduction to Hardware/Software Lab** – Spring 2019, Summer 2021\*<sup>^</sup>
  - Introductory laboratory course exploring the Arduino platform, primarily for students without engineering background
- ESE350/519: **Embedded Systems Lab** – Fall 2020<sup>^</sup>, Spring 2021\*<sup>^</sup>
  - Advanced laboratory course covering the foundations and design of embedded systems platforms, across both hardware and software levels
- ESE450/451: **ESE Senior Design** – Fall 2019, Spring 2020<sup>^</sup>, Fall 2020\*<sup>^</sup>, Spring 2021\*<sup>^</sup>
  - Two-part senior capstone project series for students in the Electrical and Systems Engineering department and related majors

## **Research Experience**

### **Pennovation – Embedded Systems Researcher – Occupancy Detection Device**

- ❖ Goals:
  - Designing a hybrid sensor device for occupancy detection
  - Collecting in-lab occupancy test data to identify which combinations of sensors most accurately count occupants while conserving power consumption
  - Aiming to enhance automatic lighting control as a possible application
- ❖ Tools:
  - C for interfacing with sensors via an ATmega328p microcontroller
  - MATLAB for data acquisition and algorithm development
  - Hybrid sensor system incorporating:
    - PIR sensor for simple motion detection
    - Thermopile array for basic person detection via infrared imaging
    - mm-wave sensor for higher-fidelity person tracking
  - Camera-based computer vision compared against hybrid sensor system as baseline
- ❖ Work guided by [Automation Research Group](#) and [Instahub of Pennovation](#)
- ❖ Began in June 2020 and ended in May 2021

## **Skills and Coursework**

**Languages:** Native in English, fluent/heritage in Spanish, elementary in French

**Key Courses Taken:** Operating Systems, Computer Architecture, Embedded Systems, Mechatronic Systems, Autonomous Robotics, Signal Processing, Control Systems, Digital/Analog/RF Electronics

### **Technologies Learned/Utilized:**

- ❖ Software
  - Programming languages such as C, C++, Python, MATLAB
  - Hardware description languages such as Verilog
  - Programming environment tools such as Simulink, ROS
  - Operating systems tools such as Unix shells
- ❖ Hardware
  - Microcontrollers such as ATmega328P, ESP32
  - Circuit simulation tools such as SPICE, Ngspice
  - PCB design tools such as Altium, EAGLE
  - Various electrical components and devices such as resistors, capacitors, inductors, diodes, AC and DC currents, MOSFETs, BJTs, op-amps, transducers, sensors, servomotors, DC motors, batteries, power supplies, voltage regulators, etc.

### **Activities and Interests**

- ❖ SEAS Orientation Peer Adviser for Class of 2022 (CIS) and Class of 2023 (CMPE)
- ❖ SEAS Mentor for First-Year Robotics Graduate Students in Spring 2021
- ❖ Head of Hardware team for PennApps hackathon from Spring 2019 to Spring 2021, organized with Major League Hacking (MLH)
- ❖ Member of the organizing committee for the 2019 CIS Diversity Summit

### **Awards and Recognitions**

- ❖ Recipient of the 2017 Penn Undergraduate Research Mentoring (PURM) Grant
- ❖ Recipient of the 2018 Penn Engineering Exceptional Service Award
- ❖ Recipient of the 2019 Littlejohn Scholars Summer Research Grant
- ❖ 2019-20 J.P. Eckert Fellow
- ❖ 2020 inductee of the CIS TA Hall of Fame
- ❖ Recipient of the Summer 2020 TA Award for Excellence in Student Support with Distinction
- ❖ 2021 ESE Diversity, Equity, and Inclusion Fellow
- ❖ Honorable Mention for the 2021 Penn Engineering Outstanding Teaching Award
- ❖ 2021-22 Carnegie Institute of Technology Dean's Fellow

***References available upon request.***