Guadalupe Bernal

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Education

Cornell University, Ithaca, NY Expected: May 2023

BEng Electrical Computer Engineering, College of Engineering

Selected Coursework: Theory of Linear Systems, Embedded Systems, Math of Signal and System Analysis

Work Experience

Software Engineering Intern (CCG VPU), Intel Corporation, Folsom, CA 2020-05 2020-08

- Created a Google Test Infrastructure for Direct3D Compute and LevelZero VPU (Vision Processor Unit) APIs, where the VPU is used as a machine learning accelerator
- Created a debug adaptor in C++ to communicate between the Visual Studio Code debugger interface and an Intel Movidius back-end debugger using TCL over TCP/IP

Software Engineering Intern (NSG), Intel Corporation, Folsom, CA 2019-06 2019-08

- Generalized JSON constructs using C++ variadic templates to output data streams of data collected during validation of NAND devices. Proposed new method for time predictions of 3DXP validation flows using ML.

Software Engineering Intern (NSG), Intel Corporation, Folsom, CA 2018-06 2018-08

- Developed optimized functional and integration tests in python to detect early failures in 3D XPoint memory controllers for Intel Optane devices and primitives for integration with a Tektronix TLA 7000 logic analyzer

Research Experience and Projects

Summer Undergraduate Research Fellowship (SURF), Stanford University 2022-06 2022-08

Synchronous Reluctance Motor (SynRM), Ithaca, NY 2021-08 2022-05

- Worked on a low-power motor design using COMSOL for the electromechanical modeling with the goal of scaling down existing designs with possible applications to reaction wheels and CubeSats in Prof. Peck's Lab SSDS (Space Systems Design Studio).

Experimental Test Beds for Eddy-current Attraction, Ithaca, NY 2019-02 2022-05

- Designed and implemented a test rig for permanent magnet eddy-current actuators to measure the relative force normal to a non-magnetic, conductive plate. Research funded by NASA in Prof. Peck's Lab SSDS.

Single Camera Robot Localization and Mapping 2020 - 2021

- Worked on a deep-learning model for path-segmentation, identification, and mapping suitable for low-powered compute embedded devices, such as the Intel Movidius VPU, specifically a modified U-Net topology.

Robotic Platform for Autonomous Development 2018 - 2019

- Developed a generic robotic platform and a C++ library to control 4 independent wheels with 8 encoded motors. Architecture included 3 microcontrollers and USB and bluetooth communications.

Publications

Conference Papers

- K. T. Wilson, **G. Bernal**, and M. A. Peck, "A Translating Eddy-Current Actuator for Proximity Relative Positioning of Spacecraft," AIAA SciTech, 2022. [DOI]
- **Bernal G.** (October 2021). Low-Friction Demonstrator for Magnetic Actuation of Spacecraft. IEEE MIT URTC. [DOI]

Journal Paper

- K. T. Wilson, **G. Bernal**, and M. A. Peck, "An Eddy-Current Actuator for Non-ferromagnetic Attraction and Repulsion of Spacecraft," in preparation for the Journal of Guidance, Control, and Dynamics, 2022.

Presented at Following Conferences

- American Institute of Aeronautics and Astronautics (AIAA) SciTech Forum Conference 2022-01
- National Conference for McNair Scholars and Undergraduate Research 2022-03
- MIT Undergraduate Research Technology conference (URTC) 2021-10
- Cornell Undergraduate Research Board (CURB) Spring Symposium [ABS] 2021-05