

# PAOLO ARGUELLES

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## Graduate Student in Electrical and Computer Engineering

### SUMMARY

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- **Started university at the age of 14** at California State University, Los Angeles
- Began graduate study at Cornell University **at the age of 19**
- Research interests and experience span **bio-inspired swarm robotics, space technology** and **small satellite design**, to **developing MEMS sensors for national defense**, and public policy

### EDUCATION

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#### Cornell University

Master's Candidate in Electrical and Computer Engineering

*Expected Graduation: May 2019*



#### California State University, Los Angeles

Bachelor's Degree in Electrical Engineering

*Graduated: May 2018*

- GPA: **3.99 / 4.00**
- Graduated **Summa Cum Laude** and **Honors College**

### SELECTED PROJECTS and RESEARCH WORK

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#### AEROSPACE AND DEFENSE

##### CubeSat Solar Sail Attitude Control

*Northrop Grumman and Cal State LA*

**Advisors:** Dr. Ni Li; Karl Salinas and Ted Nye, Northrop Grumman

**Project Description:**

- This senior design project explores the novel use of solar sails to achieve attitude control in low-earth orbit on small satellites.
- Electrical engineering and simulation team lead
- Simulated solar sail dynamics and orbit optimization on MATLAB and Simulink
- Built wireless small-scale test article to verify simulated dynamics in wind tunnel
- Project conducted in accordance with Northrop Grumman standards

**Publications and Deliverables:**

- Engineering Design Review Presentations: SRR, PDR, CDR
- Working wind tunnel testbed and prototype of payload concept
- Co-authored ASME conference paper for the "2018 International Mechanical Engineering Congress and Exhibition"

##### Attitude Testbed and Spacecraft Flight Simulator

*Space Systems Design Studio (SSDS), Cornell University*

**Advisor:** Dr. Mason Peck, NASA Chief Technologist (2011 – 2013)

**Project Description:**

- Simulate multi-axis spaceflight on air bearing
- Simulator features reaction wheels and thrusters
- Open- and closed-loop control realized through Simulink interface

##### SAW-Bulk Gyroscope

*Defense Advanced Research Projects Agency (DARPA)*

**Principal Investigator:** Dr. Amit Lal, SonicMEMS Lab at Cornell University

**Project Description:**

- High tolerance, solid-state gyroscope for inertial sensing on munitions
- Collaboration with DARPA's PRIGM:AIMS program
- MEMS chips fabricated in the Cornell NanoScale Facility (CNF)



#### ROBOTICS

##### Mobile Robot to Support Collaborative Swarms

*Collective Embodied Intelligence Lab, Cornell University*

**Principal Investigator:** Dr. Kirstin Petersen, Cornell University

**Project Description:**

- Autonomous rover to conduct crowd control in disaster or high-duress scenarios
- Features an inflatable bladder and projector to display information



#### BIOMEDICAL ENGINEERING

##### Toward a Medical Tricorder

*Microfluidics and Point-of-Care Diagnostics, Cal State LA*

**Principal Investigator:** Dr. Frank Gomez, Cal State LA

**Project Description:**

- Applied artificial neural networks (ANN) to assist diagnoses performed on paper- microfluidic assays
- Culmination of two years of research with the Gomez Lab

**Publications and Deliverables:**

- 75-page thesis *Toward a Medical Tricorder*, successfully defended in April 2018
- Journal publication in June 2018 issue of *Electrophoresis*

##### Digital Microfluidic Paper Analytical Device

*Microfluidics and Point-of-Care Diagnostics, Cal State LA*

**Principal Investigator:** Dr. Frank Gomez, Cal State LA

**Project Description:**

- Actuate solution droplets across a circuit board via electrowetting
- Culmination of two years of research with the Gomez Lab
- Subject of 75-page thesis titled *Toward a Medical Tricorder*, successfully defended in April 2018



## OTHER PROJECTS

### String-theoretic Modeling of Gravitational Waves in 9+1 Dimensions

*String Theory Research Group, Cal State LA*

**Advisor:** Coleman Dobson, Cal State LA

**Project Description:**

- Modeled LIGO-detected merger events as a “fuzzball” collision, building upon the pioneering research of Dr. Samir Mathur
- Gave talk at 2016 Southern California Conference for Undergraduate Research (SCCUR)

### Spinal Cord Injury Patient Rehabilitation

*DREAM Project, Cal State LA*

**Principal Investigator:** Dr. Deborah Won, Cal State LA

**Project Description:**

- Created wearable device to collect EMG, HR, and accelerometry data
- Device interfaces with mobile app to motivate spinal cord injury patients to exercise through “exergaming”
- SENSORNETS 2018 Conference Publication



## PUBLIC POLICY

### Sustainability in the LA River

*Pat Brown Institute for Public Affairs*

**Advisor:** Raquel Beltran, Former Director of the League of Women Voters – Los Angeles

**Project Description:**

- Explores how the Lower LA River Revitalization Plan positively impacts Southeast LA (SELA) communities, and how a robust transportation infrastructure can enhance this effort

### LA County: A Portrait of Engagement

*Pat Brown Institute for Public Affairs*

**Advisors:** Dr. Raphael Sonenshein, Executive Director of the Pat Brown Institute; Dr. Max Baumgarten, Public Policy Analyst

**Project Description:**

- Created data visualizations of Institute polling data
- Study aims to summarize attitudes on local and federal issues among local ethnic groups
- Interactive visualizations published on Institute website and social media platforms

## AWARDS and RECOGNITION

### Barry Goldwater Scholarship Foundation

2016 Honorable Mention

### 2018 Early Entrance Program Class Speaker

Addressed 2018 Honors College graduates at annual dinner

### Edison International Honors Scholar

2014 Edison Scholar, funded by Southern California Edison

### Honors College Scholarship

Awarded to a first-year Honors College student

### Tau Beta Pi Engineering Honor Society

California Iota Chapter (ID: 124-01765-0)

### Award for High Academic Honors

Johns Hopkins University Center for Talented Youth

### 2018 Honors Convocation Speaker

Elected by engineering faculty to address 2018 honorees

### 2018 Cal State LA Senior Design Award

Awarded to student

### Jose Rizal Scholastic Achievement Award

2014 Scholar

### Dean's List (2013-2018)

Achieved a near-perfect 3.99 GPA

### Joyce Bourke Memorial Scholarship

Awarded to an outstanding Early Entrance Program student

### Phi Kappa Phi Honor Society

Chapter 93

## LEADERSHIP and VOLUNTEER EXPERIENCE

### Institute of Electrical and Electronics Engineers (IEEE)

President and Chair, Cal State LA Chapter (2017-2018)

Worked with faculty in electrical engineering, University administrators, and leaders from the Metro-LA IEEE chapter to operate the University IEEE chapter with emphasis placed on research, create a new Chapter brand identity, and assist in the job-seeking process for students.

### The G-Word Documentary

Featured in upcoming documentary about gifted youth community

Worked with Academy Award-nominated documentarian Marc Smolowitz in his upcoming documentary *The G-Word*.

### Early Entrance Program Club

President (2016-2017)

Represented the Early Entrance community at large as student body president, acting as the student liaison to University administration

### Pat Brown Institute for Public Affairs

Public Policy Intern (2017-2018)

Represented the Early Entrance community at large as student body president, acting as the student liaison to University administration

## SKILLS and TECHNICAL PROFICIENCIES

- **Software:** MATLAB, Simulink, LabVIEW, SolidWorks, Eagle, Fusion, Adobe AE
- **C/C++, Python, Bash**
- **Writing (Technical and Creative)**
- **MEMS Design**
- **Public Speaking and Communication**  
Extensive public speaking experience delivering engineering design presentations, research talks, and speeches at conferences, dinners, and events.
- **Presentation and Report Design**