# Enrique Alberto Segura Carrillo

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EDUCATION

California State University, Los Angeles, Los Angeles, California — June 2021
M.S. Physics

University of California, Los Angeles, Los Angeles, California — June 2017
B.S. Physics

FELLOWSHIPS AND AWARDS

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| Larry Chu Scholarship | July 2020 |
| Graduate Equity Fellowship | June 2020 |
| NIH MBRS-RISE MS-to-PhD Fellowship | June 2020 |
| Sally Casanova Scholar | May 2020 |
| American Physical Society Bridge Fellow | August 2019 |
| SLAC Alonzo W. Ashley Research Fellowship | November 2017 |

PUBLICATIONS

Mc Goldrick, Ciarán, Mark Matney, Enrique Segura, Youngtae Noh, and Mario Gerla (2015). "WaterCom: A Multilevel, Multipurpose Underwater Communications Test Platform". In: *Proceedings of the 10th International Conference on Underwater Networks & Systems*. WUWNET '15. Arlington, VA, USA: ACM, 14:1–14:8. ISBN: 978-1-4503-4036-6. DOI: 10.1145/2831296.2831336. URL: http://doi.acm.org/10.1145/2831296.2831336.

Mc Goldrick, Ciarán, Enrique Segura, Tianyan Wu, and Mario Gerla (2016). "WaterCom: Connecting Research Configurations with Practical Deployments: A Multilevel, Multipurpose Underwater Communications Test Platform". In: *Proceedings of the 11th ACM International Conference on Underwater Networks & Systems*. WUWNet '16. Shanghai, China: ACM, 8:1–8:2. ISBN: 978-1-4503-4637-5. DOI: 10.1145/2999504.3001118. URL: http://doi.acm.org/10.1145/2999504.3001118.

RESEARCH

*Microelectronics Intern Researcher* — June 2020 - September 2020
The Aerospace Corporation, El Segundo, CA
- Will develop simulations of MOSFETs under radiation effects for space applications, implement physics-based model using Silvaco TCAD, and perform electrical characterization of microelectronic devices to test model's accuracy.
- Mentors: Dr. Adam Bushmaker and Dr. Jennifer Taggart.

*Graduate Student Researcher* — January 2020 - Present
California State University, Los Angeles, Los Angeles CA
- Working on experiment automation of Keithley nanovoltmeters, probes and oscilloscopes using LabView and Python to implement a feedback controller to measure spin to spin relaxation time using NMR techniques.
- Mentor: Prof. Oscar Bernal.

*Visiting Researcher* — November 2018 - November 2019
UCLA Network Research Laboratory, Los Angeles, CA
- Developed implementation of a Quantum Neural Network (QNN) to study the near term gate quantum computer model using Google's Cirq.
- Tested QNN on a toy-model representing a Stern-Gerlach device under bit-flipping and on 2D Ising model with transverse field.
- Designed a pedagogical colab notebook as a tutorial showcasing this implementation.

*Science and Engineering Associate I* — November 2017 - November 2018
SLAC National Accelerator Laboratory, Menlo Park, CA
- Developed Physical Optics Propagation simulations of a Gaussian beam and a flat-top beam propagated on a laser transport comprised of a series of telescopes and mirrors under random perturbations using ZEMAX.

- Created numerical model to predict effects of thermal changes in a laser system intended for Plasma Wake-field Particle acceleration.
- Developed an algorithm by using the detected changes in laser position across the transport, the numerical model, and a PID-controller to stabilize the laser system.
- Designed and built a two-mirrors-two-CCDs system with pico-motors to characterize the effects of hysteresis in the algorithm's performance.
- Applied image processing using template matching and low-pass filters to recognize, differentiate, and track the intended laser spot across the laser system.
- Algorithm stabilize the effects of thermal fluctuations by a factor of 40 in 24-hour period.
- Algorithm's feedback enables experiments to run 24/7, dramatically improving from the previous thermally-imposed experimental time-window of 10 pm - 8 am.
- Algorithm's control allows uninterrupted experimental runs removing the need for a time-consuming manual alignment every 30 minutes.
- Presented project's results to LCLS team at SLAC to showcase its potential as a suitable feedback method for LCLS's beamline.
- Mentors: Dr. Mark Hogan and Dr. Brendan O'Shea.

*Undergraduate Researcher*                                              Summer 2015 - Summer 2017
UCLA Network Research Laboratory, Los Angeles, CA
- Developed web infrastructure to remotely schedule experiments.
- Prepared embedded hardware for experiments by developing parallel compilation of NRL's MPTCP Linux Kernel on Raspberry Pis.
- Executed data acquisition of vehicular and underwater wireless experiments.
- Implemented data analysis of experimental data to quantify network traffic trade-offs between TCP vs MPTCP.
- This research was supported by NSF Grant 1205757.
- Mentors: Dr. Jorge Mena, Prof. Ciaran Mc Goldrick and Prof. Mario Gerla.

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| ADDITIONAL TRAINING | Princeton Plasma Physics Laboratory Graduate Summer School | Summer 2019 |
| | SLAC Summer Institute | Summer 2018 |
| | SLAC Machine Learning Applications for Particle Accelerators Mini-Workshop | Spring 2018 |

POSTER

Segura Carrillo, Enrique (2019). *Mitigating Slow-Drift Effects for Plasma Wakefield Particle Acceleration*. Princeton, NJ, USA: Princeton Plasma Physics Laboratory Graduate Summer School.

TEACHING

*Graduate Assistant*                                                          Fall 2019
California State University, Los Angeles, Los Angeles, CA
- Supported laboratory physics course focused on experimental debugging to teach physics concepts.

*CSL Fellow*                                                          Fall 2016, Winter 2019
Hispanic Heritage Foundation, Washington, D.C.
- Developed computer science fundamentals course at Telfair Elementary using Scratch during Winter 2019.
- Provided programming fundamentals workshop at San Fernando High School Magnet's AP Computer Science course using Java during Fall 2016.

*Computer Science Instructor*                                                          Summer 2017
SMASH Academy, University of California, Los Angeles
- Developed computer science fundamentals course on Python for gifted high school students.

*Computer Science Instructor*                                                          Spring 2017
ACM TEACH LA, UCLA Lab School, Los Angeles, CA
- Co-lead on a computer science course for gifted fifth graders at UCLA Lab School using Python.

PROGRAMMING     Python, LabVIEW, MATLAB, Linux, Raspberry Pi 3, Arduino, Fortran, Zemax, Cirq, Qiskit, Mathematica.