Enrique Alberto Segura Carrillo

CONTACT INFORMATION

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

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

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.

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.

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.

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