

# Rafael Alberto Rivera-Soto

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🌐 [www.github.com/rrivera1849](https://www.github.com/rrivera1849)

Undergraduate researcher at Lawrence Livermore National Laboratory. Passionate between the intersection of Artificial Intelligence and Computer Security.

## Employment

### Lawrence Livermore National Laboratory

Computer Scientist

Livermore, CA

September 2015–Present

As a Computer Scientist in LLNL, I've worked on a wide variety of efforts some of which include but are not limited to:

- Created models for a coupled transmission-communication simulation for studying the effects of cyber attacks on the transmission system.
- Built a neural network model for predicting the amount of PV generation in a particular distribution installation.
- Created a convolutional neural network model for identifying the compilers, versions and flags used to create a binary.
- Researching neural network models to identify the author of a particular source code sample.

## Education

### Academic Qualifications.....

#### Stanford University

SCPD Student

Stanford, C.A.

2016–Present

#### Universidad del Turabo

Bachelor of Science, Computer Engineering, Cumulative GPA 3.78

Gurabo, Puerto Rico

2012–2015

#### Thomas Alva Edison School

High School

Caguas, Puerto Rico

August 2009–May 2012

## Experience

### Universidad del Turabo

Research Assistant

Gurabo, PR

August 2013–May 2015

- Assisted professor in researching algorithms for hyper-spectral image compression using neural networks

### Internships.....

#### Lawrence Livermore National Laboratory

Undergraduate Intern–Cyber Defenders Student Program

Livermore, CA

June 2015–August 2015

- Created an authentication system for an internal web application. The system is able to account for access from three different security classification networks and adjust accordingly.

#### Lawrence Livermore National Laboratory

Undergraduate Intern–Cyber Defenders Student Program

Livermore, CA

June 2014–August 2014

- Designed a model which describes the amount of time it takes a power grid network to recover to against a certain amount of damage.
- Created a simulation to study the robustness and resilience of the power grid against various attacks.

#### **Lawrence Livermore National Laboratory**

**Livermore, CA**

*Undergraduate Intern—Cyber Defenders Student Program*

*June 2013–August 2013*

- Designed a model which describes the effect of cascading power failures in a power grid network.
- Implemented a simulation to study the resilience of different network models against various types of attacks.

#### **Leadership**

- Founding board member of the ACM (Association for Computing Machinery) and Tau Alpha Omega chapters at the University of Turabo.
- Organized student workshops and documented reunions for the Association for Computing Machinery.

### **Achievements**

#### **Universidad del Turabo**

*Member of the Tau Alpha Omega Engineering Honor Society*

**Gurabo, Puerto Rico**

*March 2014–Present*

#### **Universidad del Turabo**

*Caribbean Computer Center of Excellence scholar*

**Gurabo, Puerto Rico**

*August 2012–August 2014*

#### **AGMUS Research Symposium**

*Presenter at Puerto Rico Researchers Council*

**San Juan, Puerto Rico**

*March 7, 2014*

Presented results of compressing hyper-spectral images using neural networks.

#### **Instituto Tecnológico de Santo Domingo**

*Participant at Caribbean Finals, ACM-ICPC*

**Dominican Republic**

*November 9, 2013*

#### **University of Puerto Rico**

*Second place in the ACM-ICPC Puerto Rico National Competitions*

**Bayamon, Puerto Rico**

*October 5, 2013*

#### **University of Puerto Rico**

*Second place in the UPR-Bayamon Computer Programming Competition*

**Bayamon, Puerto Rico**

*April 27, 2013*

### **Projects & Other**

#### **Deep Reinforcement Learning Bootcamp**

*University of Berkeley*

**Berkeley, California**

*August 26-27 2017*

- Learned the foundations of Deep Reinforcement Learning through a mixture of lectures and hands-on lab sessions.

#### **Machine Learning for Conversational Agents**

- Used data from the Ubuntu Dialog Corpus as well as Twitter to create a retrieval-based and generative conversational agent
- Implemented a retrieval-based agent using two LSTM's to encode the question and candidate answers, thereby comparing the similarity between the two and giving it a score
- Implemented a Sequence to Sequence model with an attention mechanism to generate responses to arbitrary conversation context

#### **Machine Learning for Brand Loyalty Prediction**

- Using data from the Nielsen Consumer Panel Dataset, developed a brand loyalty prediction system
- Implemented three machine learning techniques: SVM, Multinomial Logistic Regression and K-Means Clustering on consumer data
- The model was able to predict whether or not a user would be loyal to the brand with an accuracy of 95%.

#### Algorithm Implementations

- Implemented various algorithms: Tries, Merge Sort, Quick Sort and contributed them to an open source project: <https://github.com/kennyledet/Algorithm-Implementations>

## Skills

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**Programming Languages:** Proficient in Python, C++ Strong Experience in C and Java

**Environment** Windows, Linux

**Deep Learning Libraries:** PyTorch, Tensorflow, Keras

**Computer Forensic Tools:** IDA, OllyDbg, Autopsy

Fluent Spanish and English speaker

## Publications

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- [1] J. Coignard, T. Nouidui, C. Gehbauer, M. Wetter, J.-Y. Joo, P. Top, R. R. Soto, B. Kelley, and E. Stewart. Cyder - a co-simulation platform for grid analysis and planning for high penetration of distributed energy resources. page to appear, 2017.
- [2] J. O. N. Colón, Y. M. Masalmah, C. M. Nieves, and R. R. Soto. A proposed desktop grid/cloud computing network design for hsi target detection applications. 2015.
- [3] Y. M. Masalmah, C. Martínez Nieves, R. Rivera Soto, C. Velez, and J. Gonzalez. A framework of hyperspectral image compression using neural networks. In *Latin American and Caribbean Conference for Engineering and Technology Proceedings*, volume 13. Univ. del Turabo (Puerto Rico), 2015.
- [4] P. Top, E. Banks, P. D. B. Jr., S. Bromberger, B. M. Kelley, R. R. Soto, B. Salazar, S. G. Smith, and N. Yee. Simulation of a rtu cyber attack on a transformer bank. page to appear, 2016.