

# 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 about the possibilities between the intersection between 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. Results had to meet  
Built a NARX neural network model for predicting the amount of PV generation in a particular 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

### 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***Undergraduate Intern–Cyber Defenders Student Program***Livermore, CA***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****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%.

### 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

### 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. Noudui, 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.