

# Jordan Alexis Caraballo-Vega

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Senior, B.S. Computational Mathematics

University of Puerto Rico at Humacao

EXP GRAD: Dec 2019, GPA: 3.88/4.00

## PROFESSIONAL EXPERIENCE

### **Software Engineer & IT Security Specialist, NASA Goddard Space Flight Center - NCCS High Performance Computing Security Team (2016-Pres)**

**Intern:** Summer 2016, Fall 2016, Summer 2017, Summer 2018

**Contractor under ADNET Company:** Spring 2017, Fall 2017, Spring 2018

**Civil Servant (Pathways Program):** Fall 2018, Spring 2019

- Lead System Architect and Administrator of DevSecOps infrastructure.
- Responsible for the engineering of software and information systems to support log analysis infrastructure for anomaly detection.
- Responsible for performing source code and pen-testing reviews to web-based software for the NCCS production systems purposes.
- Serve as a Linux and Unix system administrator for security and resource intensive systems.
- Responsible for the implementation of a high-speed data transfer infrastructure.
- Responsible for advancing research on a low cost 100 Gbps firewall at the NASA Center for Climate Simulation.
- Responsible for developing a novel automated method to assess, track, and report the status of compliance and vulnerabilities using SCAP.

### **Computational Research Assistant - PREM UPR-Humacao – Partnership for Research and Education in Materials (2013-Pres)**

- Lead 5 Undergraduate students of the UPR-Humacao Computer Science Group.
- Responsible for developing and implementing software for computational simulations towards HPC environments.
- Manage and coordinate, independently, software and hardware updates and patches.
- Assist and collaborate with ongoing research projects related to data mining, clustering, image processing, machine learning, and HPC.
- Perform well-defined tasks of a developmental nature such as design, evaluation, and analysis of software and hardware architectures.
- Serve as Linux and Network system administrator for virtual environments and GPU systems.

## SKILLS and EXPERTISE

**Programming Languages:** Python, Perl, C++, Java, Bash, SQL, HTML, CSS, PHP, Javascript

**Security Skills:** Risk Assessments, Compliance and Vulnerabilities, Software Review, Log Analysis (ELK), Network Performance Benchmarking, Network Switches, Hardware Tuning, Network Cards (1, 10, 40, 100 Gbps), Penetration Testing, DevSecOps.

**Computing Skills:** Proficient Machine Learning, Data Mining, Web-scraping, MD Simulations, HPC Data Transfer, GPU Computing.

**Operating Systems:** System Administration of Linux, Unix, Windows R2, FreeBSD

**Language Skills:** Advanced Spanish, Advanced English

## SELECTED COURSEWORK

Programming I & II, Data Structures & Algorithms, Assembly Language, Databases, Web Development, Operating Systems

Data Science and Machine Learning Certificate, University of PR Medical Sciences Campus, San Juan.

## SELECTED RESEARCH PROJECTS

### **01/19-Present, Machine Learning Techniques in Molecular Dynamics Simulations Analysis, PREM**

- Developed and solve multidimensional sets of coordinates from molecular dynamics systems using machine learning and data science techniques. Enhanced visualizations and performance of computational material science simulations analysis.

### **06/18-12/18, Continuous Assurance: Continuous Integration Meets Containers Security, NCCS-GSFC**

- Built an autonomous continuous integration infrastructure enhanced by multiple security layers to enable monitoring and security scanning engines in each phase of the DevOps project cycle. Serve as a system administrator of the infrastructure.

### **06/17-08/17, Machine Learning Techniques for Security Information and Event Management, NCCS-GSFC**

- Developed and implemented a machine learning aware ELK+ Graylog infrastructure with Security Information and Event Management (SIEM) features for log analysis and anomaly detection. Serve as a system administrator of the infrastructure.

### **08/16-12/16, Building Cost Effective High Performance 100 Gbps Firewalls, NCCS-GSFC**

- Enhanced existing firewalls by tuning the systems to balance workload for routing million of small frames (64 bytes) packets per second while achieving good bandwidth numbers at 9000 MTU. Developed software over DPDK and Netmap aware applications.

### **06/16-08/16, An Automated SCAP Security Tool, NCCS-GSFC**

- Developed tool to continuously monitor operating systems regarding Compliance and Vulnerabilities assessments. Features include: OpenSCAP and CIS-CAT, time series analysis, identification of critical rules, and a reporting pipe for Nagios interface.

### **09/14-05/15, Analysis of Trends in Scientific Publications using Data Mining, PREM**

- Implemented a software application able to query from multiple search engines looking for material science publications and their popularity. Statistical and computational techniques were used to find data patterns and to produce interactive time series visualizations.

## INTERNSHIPS

- 06/18-08/18, Summer Internship at Goddard Space Flight Center, MD, USA
- 06/17-08/17, Summer Internship at Goddard Space Flight Center, MD, USA
- 08/16-12/16, Fall Internship at Goddard Space Flight Center, MD, USA
- 06/16-08/16, Summer Internship at Goddard Space Flight Center, MD, USA
- 07/14-08/14, NSF-Pennsylvania Summer Science Initiative, University of Pennsylvania, Pennsylvania, USA
- 06/13-07/13, Caribbean Computing Excellence Summer Internship at University of Puerto Rico at Humacao, PR

## PEER REVIEWED PUBLICATIONS

- Abstract: Caraballo-Vega, J. (2018) Millions of Messages per Minute! Surviving the NCCS's Log Avalanche, Published Demo.
- Abstract: Caraballo-Vega, J. (2017) *Cybersecurity Machine Learning*, Published Demo.
- Abstract: Caraballo-Vega, J. (2016) *Building Cost Effective High Performance 100 Gbps Firewall*, Published Demo.
- Paper: JAC, Mir., F. M. (2014). *Molecular dynamics simulation of electrodes for capacitors made with nano-onions*, NCUR.

## MOST RECENT PRESENTATIONS

- **03/02/19** Presenter, *DevSecOps: Continuous Integration meets Containers Security*, XXXVI Interdisciplinary Computer Science and Math Conference, Humacao, PR.
- **11/13/18** Presenter, *Millions of Messages per Minute! Surviving the NCCS's Log Avalanche*, 2018 Super Computing Conference, Denver.
- **10/16/18** Presenter, Using Machine Learning for Anomaly Detection in HPC Environments, 2018 Institute for Teaching and Mentoring – Southern Regional Education Board, Crystal City, VA.
- **08/02/18** Presenter, Continuous Assurance for Agile Software Development, HACE – GSFC Oral Presentations, Greenbelt, MD.
- **01/26/18** Presenter, *Multiple Elements of Security Hardening*, PREM Seminars, University of Puerto Rico at Humacao.
- **10/11/17** Presenter, *Visualization and Analysis of Para-aminobenzamidine Functionalized Cellulose Nanocrystals through Molecular Dynamics Simulations*, NSF PREM Meeting, Alexandria, VA.
- **08/02/17** Presenter, *Machine Learning Techniques for Security Information and Event Management*, HACE – GSFC Oral Presentations, Greenbelt, MD.

## CURRENT LEADERSHIP POSITIONS

- **Student Representative**, Partnership for Research and Education in Materials (PREM) IRG2 Research Team – In charge of communicating the ideas of the students to the PI's and vice versa.
- **Journalist**, Society for Advancement of Chicanos/Hispanics and Native Americans (SACNAS) UPRH Chapter – Document and provide a detailed journal related to the impact of our group in the integration of students to the STEM area.
- **Vocal**, Association of Mathematics and Computer Science UPRH (ASMACC) – Association of UPRH students who participate in Math and Software development competitions.
- **Lead**, Community Group "TecnoBoomersPR" – Initiative to train elders on how to use their technological equipment and to navigate on the internet for their personal knowledge.
- **Lead**, Computer Science Group at University of Puerto Rico at Humacao - Conduct research in the areas of computational material science, software engineering, and data science.

## CURRENT VOLUNTEER POSITIONS

- **Mentor**, Science Fair at the Middle School and High School level (Computer Engineering and Math Categories)
- **Instructor**, STEM and Programming workshops at the High School and Undergraduate level.
- **Mentor**, Experimenta con PREM High School Camp – Assist at the Computational Mathematics Laboratory by giving computational and experimental activities related to material science to high school students.
- **Instructor**, NanoDays - Share mini workshops related to material science with elementary, middle, and high school students
- **Lead Student**, Alacenaria UPRH – Promote the collect of food supplies to provide resources to university students anonymously

## ORGANIZATIONS

- Material Research Society (MRS)
- Association of Students of Physics and Electronics (AFE), UPRH
- Association of Mathematics and Computer Science (ASMACC), UPRH
- National Society of High School and College Scholars (NSHSS)
- Hispanic Advisory Committee for Employees (HACE), NASA GSFC

## SELECTED AWARDS

- 07/28/17 John Mather Scholarship Awardee
- 05/17/16 Recognition by Humacao, Puerto Rico Mayor as Model Citizen
- 06/26/15 NASA MUREP Scholarship Awardee
- 05/26/15 University of El Turabo recognition for Best Values and Academic Achievement
- 05/26/15 Bristol Myers Squib Excellence in Science and Math Scholarship Awardee
- 08/20/14 Partnership for Research and Education in Materials Fellowship Awardee