

Brian Omar Cruz Rodríguez

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Education

August 2014 – June 2022 B.S in Physics, University of Puerto Rico – Mayagüez

Research Experience

Fall 2019 - present Experimental particle physics, CMS Experiment Collaboration from CERN, supervised by Dr. Sudhir Malik

Research Fellowship

January – June 2021 Awarded \$5000.00 by IRIS-HEP Fellowship for “Translating analyses into prototype analysis systems” project, mentored by Dr. Jim Pivarski (Computational Physicist at Princeton University)

- Translated the CMS Open Data Higgs to 4 leptons analysis code from its original ROOT C++ to python, using COFFEA tools.

Conferences and Workshops

April 2022 PRISM-JMT conference at University of Puerto Rico - Humacao

- Presented at-the-time results of the physics parameter studies of the Geant4 CMS simulation software.

August 2021 New Perspective (virtual) conference 2021 presentation

- Presented my “Translating analyses into prototype analysis systems” IRIS-HEP project results to the Fermilab research community.

February 2021 Github CI/CD workshop, by HSF and IRIS-HEP

- Continuous Integration and Continuous Delivery/Deployment training using Github Actions to automatically build and test codebases.

October 2020 Machine Learning for Science Hackathon Competition participation, by Dr. Sergie Glyzer

- Using machine learning and deep learning to detect potential Higgs signal from one of the background processes that mimics it

September 2020 CMS Open Data workshop offered by Fermilab LPC

- Workshop to get hands-on experience on scouting CERN's open data and using software tools such as a virtual machine to run an analysis of the data

August 2020 Virtual C++ / Standard Template Library class given by Glenn Downing, offered by Fermilab

- Class about the syntax and semantics of C++ and the Standard Template Library

June-July 2020 CMS Data Analysis School

- Using CMSSW on a bash shell and software tools such as ROOT to analyze CMS open data

Outreach

February 2021 Virtual Machine Learning Basics for K-12 STEM Teachers workshop

- Taught basic python tools using a Google Colab notebook for the teachers to better understand the taught Machine Learning tools: data wrangling, and linear and multilinear regression.

July 2020 Virtual outreach workshop to teach python coding to K-12 STEM teachers using Google Colab notebooks

- Taught Markdown and LaTeX syntax and basic python to help them play with the code of four provided notebooks: to study the Higgs-to-four-lepton decay analysis using 2011-2012 data from CERN, to calculate the invariant mass, to measure air pressure, and to plot heat maps