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Omar Moreno

Experience

2009-present **Graduate Student Researcher**, *Santa Cruz Institute for Particle Physics*, Santa Cruz, CA

- Member of the Heavy Photon Search (HPS) Collaboration consisting of over 50 physicists and engineers.
- Used frequentist statistical analysis to conduct a resonance search for a new fundamental particle, heavy photon, thought to mediate dark matter interactions.
- Developed maximum likelihood fitter to determine parameters of model describing Quantum Electrodynamics Trident background.
- Optimized selection of radiative (signal like) events using a Random Forest classifier, boosting signal/background fraction by 40%.
- Co-developer of a Java object pipeline used to process and clean up over 5 TB of noisy data from the HPS Silicon Vertex Tracker (SVT) into basic physics objects used for analysis by HPS users.
- Lead developer of a C++ package used to create and persist complex physics objects in ROOT data structures.
- Developed several Java applications used to monitor the online performance of the HPS SVT.
- Developed C++ package used to characterized the performance of several components of the HPS SVT, extract calibration constants and write them to XML.
- Developed Java front end used to load greater than 100,000 SVT calibration constants to a MySQL database.
- Key contributor to the design, installation, testing and operation of both the test and engineering run HPS data acquisition system.

2007-2009 **Graduate Student Researcher**, *Department of Physics and Astronomy, California State University, Los Angeles*, Los Angeles, CA

- Member of the GEP-III Collaboration consisting of over 50 physicists and engineers.
- Optimized detector selection resulting in an improved measurement of the analyzing powers of the reaction $p + CH_2 \rightarrow X$ at $Q^2 = 2.733$ GeV/c^2.
- Measured the form factor ratio, G_{E_p}/G_{M_p}, of the proton at a $Q^2 = 2.733$ GeV^2.

2005-2006 **Undergraduate Researcher**, *Department of Physics and Astronomy, University of California, Irvine*, Irvine, CA

- Member of the BaBar Collaboration, consisting of over 600 physicists and engineers.
- Developed C++ analysis to measure the branching fraction for the rare decay $B \rightarrow e^+e^-$
- Used a multilayer perceptron to boost the identification of the decay $\Lambda \rightarrow p\pi^-$ by 10%.

2000-2001 **Mechanical Engineering Apprentice**, *Nasa Dryden Flight Research Center*, Edwards, CA

- Designed and constructed a device used to evaluate the skin-friction reduction of several Micro-Blowing Technique skins at supersonic speeds.

Education

(Expected) 2016 **Ph.D. in Physics**, *University of California at Santa Cruz*, Santa Cruz, CA

2007-2009 **M.Sc. in Physics**, *California State University, Los Angeles*, Los Angeles, CA

2001-2006 **B.Sc. in Applied Physics**, *University of California at Irvine*, Irvine, CA

Skills

Languages Java, C++, C, Python, MySQL, XML, Mathematica. Some experience with HTML5 and Fortran

Tools ROOT, RooFit, scikit-learn, NumPy, Matplotlib, IPython, git, SVN, Linux, LaTex

Awards

2012 Margaret Burbidge Award for Best Experimental Research

2009 Margaziotis Award for Best Experimental Research

2007-2009 Louis Stokes Alliance for Minority Participation Bridge to the Doctorate Fellowship

2006 California Alliance for Minority Participation Mentor of the Year

2001-2002 Chancellor's Leadership Scholar