

Bijan HANEY

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EXPERIENCE

- Current* **Senior AI Researcher @ Start-up.**
2018 - 2019 New York, New York.
- Using PyTorch to develop computer vision programs for industrial applications (company currently still in stealth).
- 2013 - 2018 **Physics PhD Researcher @ CERN.**
Philadelphia, PA and Geneva, Switzerland.
- Higgs Boson Physics Analysis**
- Helped develop a framework in C++/ROOT to optimize the signal to background ratio for rare Higgs boson decays using terabytes worth of Monte Carlo simulations. Second largest contributor at 12% of the 30,000 lines of code.
 - Calculated 500+ systematic variations on the Higgs signal due to uncertainties in the particle theory and detector reconstruction. Used these uncertainties with a maximum likelihood method implemented in Python/ROOT to calculate a best-fit value and confidence interval for the Higgs boson cross section.
 - Trigger contact person for the analysis. Responsible for ensuring that the process of filtering the Large Hadron Collider's 40 million collisions per second down to 1000 saved events per second would not filter out the signal.
- Transition Radiation Tracker (TRT) Data Aquisition**
- Responsible for over 4200 hours of on-call shifts for real-time monitoring, calibration, troubleshooting and repair of the TRT, a particle tracker and electron identification subdetector.
 - Promoted in 2017 data aquisition operations manager to lead a team of five researchers in TRT upgrades and maintenance.
 - Developed a C++ program to access an SQL database of weekly detector threshold calibrations, plot trends of the thresholds over time, detect threshold drift due to radiation damage, and calibrate the thresholds to compensate for the drift.
 - Migrated the TRT codebase to Git and CMake and implemented continuous integration in GitLab to automatically check for bugs and compile codebase for seamless deployment.
 - Developed an easy to use TRT documentation system on the web with Jekyll and GitLab CI.
- 2012 - 2013 **Department of Energy SULI Program Intern.**
Brookhaven National Lab, Upton, New York.
- Worked on Phase-I trigger upgrades for the ATLAS Liquid Argon Calorimeter.
 - Implemented and tested Optimal Filtering algorithms to reconstruct simulated high pile-up signals in the calorimeter.
 - Used VHDL to to implement the algorithms in an FPGA.
 - Presented project at ATLAS Liquid Argon Week 2012 and was included in the 2013 Interim Design Review.

EDUCATION

- 2013 - 2018 | Ph.D. in PHYSICS.
University of Pennsylvania, Philadelphia, PA.
Thesis: *The Higgs from A_μ to Z_μ : Higgs Boson Cross Section Measurements Using Diphoton and Four Lepton Decays at 13 TeV.*
Advisor: Prof. Brig WILLIAMS. GPA: 3.96/4.00.
- 2008 - 2012 | Bachelor of Science in PHYSICS (Intensive).
Yale University, New Haven, CT.
Thesis: *Measurement of c -Mistag rate with the MV1 b -tagging algorithm in 4.7 fb^{-1} of ATLAS data.*
Advisor: Prof. Tobias GOLLING. GPA: 3.66/4.00.

SKILLS

- SCIENTIFIC: Physics, Statistics, Machine Learning, Multivariate Data Analysis, Operations Management.
- PROGRAMMING: Python (PyTorch, Scikit-Learn, Pandas), C++ (ROOT, RooStats), Javascript, Git, Unix/Linux shell scripting, SQL, L^AT_EX.
- LANGUAGES: Fluent in English and Italian.

AWARDS

- JAN 2018 | **Best Blockchain Hack, Most Promising Hack**
PENNA APPS XVII, Philadelphia, PA.
For **arXain**, an open-access, decentralized scientific journal on the Ethereum blockchain. \$1000 cash prize from the 1517 Fund.

SELECTED PUBLICATIONS

- NOV 2018 | *Combined measurement of differential and total cross sections in the $H \rightarrow \gamma\gamma$ and $H \rightarrow ZZ^* \rightarrow 4\ell$ decay channels at $s = \sqrt{13}$ TeV with the ATLAS detector.*
[Phys. Lett. B 786 \(2018\) 114-133.](#)
- OCT 2017 | *Measurement of inclusive and differential cross sections in the $H \rightarrow ZZ^* \rightarrow 4\ell$ decay channel in pp collisions at $s = \sqrt{13}$ TeV with the ATLAS detector.*
[J. High Energ. Phys. \(2017\) 2017: 132.](#)
- AUG 2015 | *Measurements of the Total and Differential Higgs Boson Production Cross Sections Combining the $H \rightarrow \gamma\gamma$ and $H \rightarrow ZZ^* \rightarrow 4\ell$ Decay Channels at $s = \sqrt{8}$ TeV with the ATLAS Detector.*
[Phys. Rev. Lett. 115, 091801.](#)