Guillermo **Hamity**

Researcher | PhD in Particle Physics

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HamityNicolas

Languages

English – Native

Spanish – Native

Afrikaans – Conversational

French – Beginner

About me

Postdoctoral Research Associate in Experimental High Energy Particle Physics at the University of Edinburgh. Research new physics in the ATLAS Experiment at the Large Hadron Collider. Passionate about applied data analysis with expertise in code development and deployment, data preparation, distributed computing, machine learning, model fittings and hypothesis testing. Involved in several leading publications and am experienced in collaborative research. I am integrated into leadership roles within the ATLAS Collaboration and have experience with lecturing and student supervision.

WORK EXPERIENCE

2019-08-01
Ongoing

Postdoctoral Research Associate — The University of Edinburgh
ATLAS Experiment
Leading researcher in analysis group within ATLAS Experiment, searching for long-lived particles decaying to tau-leptons. Active in precision analysis with interpretation in exotic physics with focus on data-driven background estimation.

Research

- Development of all areas of physics analysis, incl.: data selection, software infrastructure development and maintenance, algorithm design and deployment, and statistical intepretation.
- Development and deployment of software for particle tracking and identification in the ATLAS particle reconstruction and triggering.
- Delivery of software algorithms using neural-networks for particle identification, as well as develop common c++/python analysis tools used in the collaboration.
- Research analysis leader, involved in ongoing publications, including technical reports. Experienced in paper writing and peer-review in leading journals. Present at international conferences.
- Convene over research team in group meetings with regular communication and group work/interactions. Supervise several PhD students on analysis and tasks within the working group.

Lecturing

- Deliver lectures and workshops on machine learning with an emphasis on applicability in the field of particle physics.
- Designed MSc machine learning project using novel techniques in ML and image processing in physics. Oversee supervision and marking, and supervised honours student projects.

EDUCATION

2015-08-01
2019-07-01

PhD research — The University of Sheffield
ATLAS Experiment
Thesis: Probing the Beyond the Standard Model Higgs Sector using the ATLAS Detector

- Performed statstical analysis of Higgs and charged Higgs publications. Developed code and workfolow for statistical interpretation and interpretation of the analysis results.
- Conducted statistical interpretation of the Higgs precision measurement in the context of exotic physics models.
- Worked within common performance groups to deliver on early 2016 performance results.
- Worked on the construction and testing of silicon particle detectors for the ATLAS upgrade.
- Attended several schools on computing, machine learning, and particle physics. Teaching Assistant for several mathematics, physics and programming courses. Presented at international conferences.

2013–2015 | **MSc in Physics** — The University of Witwatersrand (ZAR)

2008–2012 | **BSc and Honours in Physics** — The University of Pretoria (ZAR)

Professional Skills

Python

Tensorflow | Scipy | Keras | Pandas | Numpy | Jupyter | matplotlib

C++

C++ | CMake | Unit Tests

Statistics

Neural Networks | Likelihood Models | ROOT | RooStats

Tools

Linux | Latex | Emacs | VS-Code | OrgMode | Markdown

Dev

Git | Git-CI | Docker | YAML | JSON | Kubernetes

Hobbies

Raspberry-pi | Electronics | Machine Code | Soldering | HTML | CSS | Apache | SQL | OnionShare | Tor

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CONFERENCES AND TRAINING

Attended the following training courses/schools:

- **5th HEP C++ Course and Hands-on Training - Advanced C++**, CERN, 11-13 Oct 2022
- **1st HEP C++ Course and Hands-on Training**, CERN, 12-16 Oct 2020
- **Analysis Preservation Bootcamp – GitLab CI/CD and Docker Fundamentals**, CERN, 17-19 Feb 2020
- **Fourth Machine Learning in High Energy Physics Summer School 2018**, University of Oxford, 6-12 Aug 2018
- **2017 European School of High-Energy Physics**, Evora Portugal, 6-19 Sept 2017
- **2016 HEP School for Experimental High Energy Physics Students**, University of Lancaster, 4-15 Sept 2016

and presented at these international conferences

- **56th Rencontres de Moriond on QCD and High Energy Interactions**, *Exotic Higgs at ATLAS and CMS*, La Thuile Italy, 19-26 March, 2022
- **21st High-Energy Physics International Conference In QCD**, *Higgs boson cross-section measurements at ATLAS*, Montpellier Fr , 2-6 July 2018
- **Kruger 2014: Workshop on Discovery Physics at the LHC** , *Beyond-the-Standard Model Higgs physics using the ATLAS experiment*, South Africa , 26 Nov, 2014

and dozens of internal workshops and conferences over the years.

RECENT PUBLICATIONS

PhysRevLett. 125.051801 2020
Search for Heavy Higgs Boson decaying into Two Tau Leoptons with the ATLAS Detector Using pp pp collisions at $\sqrt{s}$ = 13 TeV, **Phys. Rev. Lett. 125, 051801**, *ATLAS*
10.1103/PhysRevLett.125.051801

PhysRevD. 101.012002 2020
Combined measurements of Higgs boson production and decay using up to 80 fb^{-1} of proton–proton collision data at 13 TeV collected with the ATLAS experiment, **Phys. Rev. D 101, 012002**, *ATLAS*
10.1103/PhysRevD.101.012002

JHEP09(2018)139 2018
Search for charged Higgs bosons decaying via $H^{\pm} \rightarrow \tau\nu$ in the τ+jets and τ+lepton final states with 36 fb^{-1} of pp collision data recorded at $\sqrt{s}$ = 13 TeV with the ATLAS experiment, **J. High Energ. Phys. 2018, 139**, *ATLAS*
10.1007/JHEP09(2018)139

ATLAS-CONF-2022-034 2022
Search for heavy long-lived multi-charged particles in the full Run-II pp collision data at $\sqrt{s}$ = 13 TeV using the ATLAS detector, **ATLAS**
https://cds.cern.ch/record/2810156

ATL-PHYS-PUB-2022-044 2022
Reconstruction, Identification, and Calibration of hadronically decaying tau leptons with the ATLAS detector for the LHC Run 3 and reprocessed Run 2 data, **ATLAS**
https://cds.cern.ch/record/2827111

REFERENCES

Professor Sinead Farrington Website, sinead.farrington@ed.ac.uk
- *Research Primary Investigator, University of Edinburgh*

Dr Trevor Vickey Website, t.vickey@sheffield.ac.uk
- *PhD Supervisor, University of Sheffield*

Dr Nikolaos Rompotis Website, Nikolaos.Rompotis@liverpool.ac.uk
- *Work Colleague, University of Liverpool*