Curriculum Vitæ

Bruno Alves

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GitHub https://github.com/b-fontana

Experience

2019 - Current

CERN: High Granularity Calorimeter group

Project #1: Evaluation of the impact of different partial wafer geometries in the HGCal CE-E response (CMS DN-2020/001).
Supervisors: Dr. Pedro Silva, Dr. André David

Projects #2/#3: Hit calibration code porting into GPUs using CUDA / Clustering studies with test beam data
Supervisors: Dr. Marco Rovere, Dr. Felice Pantaleo

Location: Geneva, Switzerland.

2018 - 2019

Swinburne University of Technology: Machine Learning and Data Science paid internship.

Project #1: Big Data analysis with supercomputer simulations to shed light on high redshift dark matter halos.
– Python package written and released ('dmprofile')
Supervisor: Assoc. Prof. Dr. Alan Duffy

Project #2: Generative adversarial networks applied to novel astrophysical objects measured by the future James Webb Space Telescope.
– the possibility of writing a paper is being explored.
Supervisor: Prof. Dr. Karl Glazebrook

Location: Melbourne, Australia.

2018

Leiden University: Machine Learning Summer School

Convolutional neural networks applied to galaxy evolution studies.
Supervisors: Dr. Maxwell X. Cai, Dr. Jeroen Bédorf
Location: Leiden, Netherlands.

2016

CERN: Summer Student Programme

Project #1: Search for the $B_c(2S)$ meson at CMS
(CERN-STUDENTS-Note-2016-209)
Supervisor: Dr. Francesco Fiori.

Project #2: "ρ factor" studies for prompt J/ψ and $\psi(2S)$ polarization measurements.
Supervisors: Dr. Ilse Kratschmer, Dr. Carlos Lourenço.

Location: CERN, Geneva, Switzerland.

Education

2012–2018 **Integrated Master's Degree (M.Sc.) in Engineering Physics, University of Lisbon, *Instituto Superior Técnico* (IST)**
Average score: 17/20
– IST is the best engineering school in Portugal, 11th in Europe and top-50 in the world (2018 US News ranking);
– Engineering Physics at IST has currently the highest high-school entrance grade across all universities and disciplines in Portugal.
Thesis grade: 19/20
– Measurement of b-quark fragmentation fraction ratios at the CMS experiment: a key ingredient for the $B_s^0 \to \mu\mu$ rare decay analysis.
Supervisors: Prof. Dr. Nuno Leonardo, Prof. Dr. João Varela.
Contacts: nuno.leonardo@cern.ch, joao.varela@cern.ch
Location: LIP, Lisbon, Portugal.

2015 **Erasmus programme at the University of Amsterdam (UvA)**
Average score: 8/10
– The average score includes a top-1% score in Particle Physics.

Grants & Awards

2018 **Machine Learning internship grant (Melbourne, 7 months)**
– Funded by Dr. Karl Glazebrook's competitive ARC Laureate Fellowship;
Machine Learning summer school grant (Leiden, 2 months)
– Very competitive (around 60 candidates per project)

2017 **M.Sc. grant (Lisbon, 6 months)**
– Awarded by LIP (Particle Physics research laboratory)

Technical internship grant (Vienna, 6 weeks)
– Ion detector assembly

2016 **Winner: LIP Técnico Particle Challenge.**
– Answering written questions plus presentation for a panel of experts on Particle Physics.
Prize: 6 months grant.

Schools & Posters

2020 **Posters@LHCC (CERN)**
– HGCAL: Evaluation of the impact of different partial silicon wafer geometries in the response to electromagnetic showers

2019 **Efficient Scientific Computing School (Bertinoro, Italy)**
– Examination passed successfully
– Poster presentation

2019 **OpenLab courses (CERN)**
– Programming and environments for parallelism
– Computer architecture and efficient programming

Skills

Languages	Portuguese, Italian (near-native), English (C2), German (B2, certified), Mandarin (HSK1).
Computer	Programming languages Proficient: Python, C/C++, Shell/Bash Used in the past: SQL (online certification), Julia, Mathematica, Tcl, Lisp, Fortran. Others Python libraries for data analysis, processing and visualization: Numpy, Scipy, Scikit-learn, Pandas, Bokeh ... Deep learning libraries: Tensorflow, Keras GPU computing: CUDA Code versioning: git (including remote versioning) Code workflow management: luigi, law Job submission: HTCondor, Slurm Particle Physics specific: CMS-SW, Root, Uproot
Communication	Excellent communication skills developed thanks to biweekly meetings, including international CERN meetings, talks given in different countries, poster presentations and presentations for schools.
Others	– Teacher experience as a Red Cross volunteer – Frequent application of Statistics to academic work

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Geneva, 15th April 2020