Curriculum Vitæ

Bruno Alves

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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
Project #2: Hit calibration code porting into GPUs using CUDA.
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

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

2016 **Winner: LIP Técnico Particle Challenge.**
– Answering several written questions over the period of one week;
– 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 and Italian (native), English (C2), German (B2, certified), Mandarin (HSK1).
Computer	Programming languages Proficient: Python, C/C++, Shell/Bash Occasional user: Mathematica, SQL (online certification). Others Numpy, Matplotlib, Seaborn, Scipy, Scikit-learn, Pandas, Uproot, Jupyter; GPUs, CUDA; Tensorflow, Keras; Git; CMS-SW, ROOT, HTCondor Job submission to computer grids.
Communication	Excellent communication skills developed thanks to weekly meetings, including international CERN meetings, talks given in different countries, poster presentations and presentations for schools.
Others	Tutor experience as a Red Cross volunteer: – helping problematic children to better understand and enjoy Mathematics – helping foreign children that do not speak Portuguese

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Geneva, 4th February 2020