Curriculum Vitæ

Personal details

Name: Bruno Alves
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Experience

Present

CERN: High Granularity Calorimeter (HGCAL)
→ Performance studies of silicon wafers with electromagnetic showers [CMS DN-2020/001]
→ Reconstruction code design and porting to GPUs using CUDA [included in HLT TDR;targeting vCHEP2021]
→ Validation of clustering and position measurement algorithms using testbeam data with electromagnetic [CMS DN-2021/005] and hadronic showers [on-going]
→ Deep learning studies for particle identification and energy regression [developed workflow management system from scratch]

May 2019
Supervisors: Dr. P. Silva, Dr. M. Rovere, Dr. A. David, Dr. F. Pantaleo

Apr 2019

Machine Learning and Data Science internship
→ GANs as outlier detectors for JWS Telescope data
→ Big data analysis with simulations of dark matter halos
Supervisors: Prof. Dr. K. Glazebrook, Assoc. Prof. Dr. A. Duffy

Sep 2018
Location: Swinburne Univ. Technology, Melbourne, Australia

Aug 2018

Machine Learning Summer School
→ CNNs for unveiling history of galaxy mergers
Supervisors: Dr. M. X. Cai, Dr. J. Bédorf

Jul 2018
Location: Leiden Univ., Leiden, Netherlands

Sep 2016

CERN Summer Student Programme
→ Search for the $B_c(2S)$ meson at CMS [CERN-STUDENTS-Note-2016-209]
→ "ρ factor" studies for prompt J/ψ and $\psi(2S)$ polarization measurements.

Jul 2016
Supervisors: Dr. F. Fiori, Dr. I. Kratschmer, Dr. C. Lourenço

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Education

Jun 2018

Engineering Physics M.Sc., Lisbon University, IST
Average score: 17/20; Thesis grade: 19/20
→ The best portuguese engineering school, 11th in Europe and top-50 in the world (2018 US News ranking)
→ Thesis: 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 [CMS AN-2017/168]
Supervisors: Prof. Dr. Nuno Leonardo, Prof. Dr. João Varela

Sep 2012
Location: IST & LIP, Lisbon, Portugal

Dec 2015

Erasmus at the University of Amsterdam
Average score: 8/10
→ The average score includes a top-1% score in Particle Physics

Aug 2015

Grants & Awards

2018 | **Machine Learning internship grant (Melbourne, 7 months)**
→ Funded by Dr. 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

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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

OpenLab courses (CERN)
→ Programming and environments for parallelism
→ Computer architecture and efficient programming

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Skills

Languages | Portuguese/Italian (native), English (fluent), German (intermediate)

Computing | Programming languages
→ Proficient: Python, C, C++, Shell
→ Curious about Julia, Go, SQL

Others
→ General: numpy, scipy, pandas, ...
→ Visualization: bokeh (+ custom wrapper), matplotlib, seaborn
→ Machine learning: tensorflow, keras, scikit-learn
→ GPU computing: CUDA
→ Code versioning: git
→ Code workflow management: luigi
→ CERN specific: CMS-SW, ROOT, uproot, SWAN
→ Job submission: HTCondor, slurm

Communication | Excellent communication skills developed thanks to frequent meetings at CERN, talks given in multiple countries, poster presentations and presentations for schools.

Others | CERN Summer student 2020 co-supervisor:
→ Search for rare $W \to \pi\gamma$ and $W \to \pi\pi\pi$ in top events
Tutor experience as a Red Cross volunteer:
→ Help problematic children to better understand and enjoy Mathematics, including foreign children which did not speak Portuguese

Geneva, on the 3$^{\mathrm{rd}}$ of February 2021

(Bruno Alves)