
Curriculum Vitæ

Personal details

Name: Bruno Alves

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

E-mail: bruno.alves@cern.ch



Experience

2019 - 2021	CERN: High Granularity Calorimeter (HGCAL) → Performance studies of silicon wafers for electromagnetic showers [CMS DN-2020/001] → Reconstruction code design and porting to GPUs using CUDA → Validation of clustering and position measurement algorithms using testbeam data for electromagnetic and hadronic showers [CMS DN under preparation] → Deep learning studies for particle identification and energy regression Supervisors: Dr. Pedro Silva, Dr. Marco Rovere, Dr. André David, Dr. Felice Pantaleo
2018 - 2019	Machine Learning and Data Science internship → Generative adversarial networks as outlier detectors with the future James Webb Space Telescope in mind [the possibility of writing a paper is being explored] → Big data analysis with supercomputer simulations to shed light on high redshift dark matter halos Supervisors: Prof. Dr. Karl Glazebrook, Assoc. Prof. Dr. Alan Duffy Location: Swinburne Univ. Technology, Melbourne, Australia
2018	Machine Learning Summer School → Convolutional Neural Nets for unveiling galaxy mergers' past history Supervisors: Dr. Maxwell X. Cai, Dr. Jeroen Bédorf Location: Leiden Univ., Leiden, Netherlands
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. Supervisors: Dr. Francesco Fiori, Dr. Ilse Kratschmer, Dr. Carlos Lourenço



Education

2012–2018	Engineering Physics M.Sc., Lisbon University, IST Average score: 17/20; Thesis grade: 19/20 → The best portuguese engineering school, 11 th 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 $B_s^0 \rightarrow \mu\mu$ rare decay analysis [CMS AN-2017/168] Supervisors: Prof. Dr. Nuno Leonardo, Prof. Dr. João Varela Location: IST & LIP, Lisbon, Portugal
2015	Erasmus at the University of Amsterdam 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. 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
	OpenLab courses (CERN) → Programming and environments for parallelism → Computer architecture and efficient programming



Skills

Languages	Portuguese/Italian (native), English (fluent), German (upper-intermediate)
Computing	Programming languages → Proficient: Python, C, C++, Shell → Curious about Julia, Go, SQL Others → General: Numpy, Scipy, Pandas, Uproot → Visualization: Bokeh (+ custom wrapper), Matplotlib, Seaborn → Machine learning: Tensorflow, Keras, Scikit-learn → Heterogeneous computing: GPUs, CUDA → Code versioning: Git → CERN specific: CMS-SW, ROOT, uproot, SWAN → Job submission: HTCondor, Slurm
Communication	Excellent communication skills developed thanks to biweekly meetings at CERN, talks given in multiple countries, poster presentations and presentations for schools.
Others	CERN Summer student 2020 co-supervisor: → Search for rare $W \rightarrow \pi\gamma$ and $W \rightarrow \pi\pi\pi$ 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

Bruno Alves

Geneva, 3rd October 2020
