Fabrizio **Miano**

Data Scientist · Specialising in ML and AI

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"People are the best show in the world and you don't even pay the ticket."

Overview

I am a Data Scientist at Leonardo working on a number of AI projects within the scopes of energy market, public administration, and security, mainly focusing on computer vision, text mining, and natural language processing. Previously, as a Research Fellow at the University of Sussex, I was focusing on the development of an AI capable of classifying video of trials as truthful/deceptive. I did a PhD in Experimental Particle Physics at the University of Sussex where I developed skills such as, problem-solving, time management, and especially how to deal with high-rates and high-volumes of data from particle collisions collected with the ATLAS detector at CERN, Geneva.

Industrial Experience

Leonardo

Catania, IT

Data Scientist - AI Development

Jan 2019 – Now

- Energy market
  - Correlation and forecast
- Public administration, and Security
- Security
  - Text mining
  - Computer vision

Deckchair.com

Brighton, UK

Junior Data Scientist

Jun – Aug 2018

- Development of a statistical tool to detect interesting images within a dataset using Structural Similarity Index analysis (OpenCV, Scikit-Learn);
- Design of a machine learning tool to perform feature extraction via k-Means clustering (Scikit-Learn) and image classification using SVM, Keras, and Tensorflow (Inception V3);

Academic Experience

University of Sussex

Brighton, UK

Post-Doctoral Research Fellow in Data Science

Oct – Dec 2019

- Development of ML model for Truthful/Deceptive classification in videos
- Exploration of potential collaboration with other areas of research:
  - Evolutionary and Adaptive Systems Research Group
  - Industrial Informatics and Signal Processing Research Group
  - Sensor Technology Research Centre

University of Sussex / CERN

Brighton, UK / Geneva, Switzerland

Doctoral Position

Nov 2014– Oct 2018

- Developed Python code to perform multi-variable signal-over-background optimisations to define signal-enriched regions to enhance signal contribution while discriminating against background
- Modelling of main backgrounds using custom C++ framework
- Data-Driven estimation of an *irreducible* background and evaluation of related theory uncertainties (C++, Python, Excel)
- Participation in the development and commissioning of vertex reconstruction algorithm (C++)
- Validation of the changes to the used framework before release
- Monitoring of the performance of the tracking efficiencies
- Development of a monitoring tool (Python) to display the results of the monitoring (plots, tables) on a web page (HTML)

Università degli Studi di Catania

Catania, Italy

MSc INFN-funded project

Mar 2013 – Jul 2014

- Developed C++ code to simulate physical distributions of the emission of protons from a nuclear source of a given size and life-time
- Validation of the simulations
- Deduction of the geometrical size and life-time of a nuclear source created in a heavy-ion collision at intermediate energy using data collected with the LASSA detector of the NSCL, Michigan, US.

Education

University of Sussex / CERN — *Brighton, UK / Geneva, Switzerland*

PhD in Experimental Particle Physics — *2015–2018*

Optimisation studies and data-driven background estimation in searches for the supersymmetric partner of the top quark with the ATLAS Detector at the LHC

Università degli Studi di Catania — *Catania, Italy*

MSc in Experimental Nuclear Physics — *2009–2014*

Protons emission and space-time characterisation in heavy-ion collisions

Università degli Studi di Catania — *Catania, Italy*

BSc in Physics — *2005–2009*

Study of neutrons spectra emitted by Am-Be and Pu-Be radioactive sources

Skills

ML Tools	scikit-learn, Keras
Computer Vision	scikit-image, OpenCV, Image
Programming	Python, C/C++, JAVA, Bash, LaTeX
Office Suite	Word, Excel, PowerPoint
OSs	Linux, macOS, MS Windows
Teaching	Classical Physics and Electromagnetism; Properties of Matter
Languages	English (Fluent), Spanish (Fluent), Italian (Mother tongue)

Public Speaking

DISCnet showcase — *Royal Society, London, UK*

"From Particle Physics to Computer Vision" — *Dec 2018*

10-min talk on the AI software developed for Deckchair.com

HLT-UK Meeting — *University of Oxford, UK*

"HLT tracking performance" — *Sep 2017*

15-min talk: Presented the result of the performance of the tracking of the ATLAS Inner Detector

Phenomenology 2017 — *Pittsburgh, PA, USA*

"Searches for direct production of third generation squarks with the ATLAS detector" — *May 2017*

15-min talk: Presented the results of the searches for third-generation squarks on behalf of the ATLAS Collaboration

International Conference on High Energhy Physics (ICHEP) 2016 — *Chicago, IL, USA*

"The Design and performance of the ATLAS Inner Detector Trigger for Run 2 collisions at $\sqrt{s} = 13$ TeV" — *Aug 2016*

Poster presented on behalf of the ATLAS Collaboration: Results of the performance of the ATLAS Inner Detector

STFC HEP Summer School — *Lancaster, UK*

"Direct pair production of the top squark in all-hadronic final states in *pp* collisions with the ATLAS detector" — *2015*

Poster: preliminary results of the optimisation of the regions of interest for the search of the supersymmetric partner of the top quark

Università degli Studi di Catania — *Catania, Italy*

"Emission of protons and space-time characterisation in heavy-ion collisions" — *2014*

20-min talk: presented final-year research project

Awards

2018	**Post-doctoral Fellowship**, STFC Impact Acceleration Account	*Brighton, UK*
2018	**Grant**, DISCnet	*Brighton, UK*
2016	**Doctoral grant**, Doctoral Overseas Conference Grant for Postgraduate Researchers	*Chicago, IL, USA*
2015	**Scholarship**, 4-year PhD scholarship in collaboration with CERN	*CERN, Switzerland*
2013	**Scholarship**, 1-year MSc scholarship in collaboration with LNS	*Catania, Italy*

Outreach

Jun 2018	**#ScienceOnBuses**, Participated in filming and engaged pepole on buses about CERN research activities	*Brighton, UK*
Nov 2017	**HiSPARC**, Helped middle school student build a scintillator for cosmic-ray detection	*Brighton, UK*
May 2016	**CERN Master class**, Talked to a high-school students audience about "The life of a PhD student at CERN"	*CERN, Switzerland*
Feb 2015	**Brighton Science Festival**, Engaged kids through games related to particle physics	*Brighton, UK*

Publications

Articles in peer-reviewed journals

[2] The ATLAS Collaboration. “Performance of the ATLAS trigger system in 2015”. In: *The European Physical Journal C* 77.5 (May 2017), p. 317. ISSN: 1434-6052. DOI: 10.1140/epjc/s10052-017-4852-3. URL: https://doi.org/10.1140/epjc/s10052-017-4852-3.

[3] The ATLAS Collaboration. “Search for a scalar partner of the top quark in the jets plus missing transverse momentum final state at $\sqrt{s}$=13 TeV with the ATLAS detector”. In: *JHEP* 12 (2017), p. 085. DOI: 10.1007/JHEP12(2017)085. arXiv: 1709.04183 [hep-ex].

[4] The ATLAS Collaboration. “Search for dark matter produced in association with bottom or top quarks in $\sqrt{s}$ = 13 TeV pp collisions with the ATLAS detector”. In: *The European Physical Journal C* ICHEP2016 (2016), p. 856. eprint: 1710.11412. URL: https://doi.org/10.1140/epjc/s10052-017-5486-1.

[5] The ATLAS Collaboration. “Search for the Supersymmetric Partner of the Top Quark in the Jets+$E_{\mathrm{T}}^{\mathrm{miss}}$ Final State at $\sqrt{s} = 13$ TeV”. In: *CERN Document Server* (2016).

International peer-reviewed conferences/proceedings

[1] F. Miano for the ATLAS Collaboration. “The design and performance of the ATLAS Inner Detector trigger for Run 2 LHC collisions at $\sqrt{s} = 13$ TeV”. In: *Proceedings, 38th International Conference on High Energy Physics (ICHEP 2016): Chicago, IL, USA, August 3-10, 2016*.