# Fabrizio **Miano**

Data Scientist · ML & AI · DevOps

*Catania, Italy*

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## Overview

I am a Data Scientist at Leonardo working on a number of projects within the scopes of public administration, energy market, and defence. The projects I have been involved in required expertise on data crawling, text, audio, and image processing, as well as team management, project coordination time- and budget-wise. Previously, as a Research Fellow at the University of Sussex, I was focusing on the development of a machine learning algorithm for the classification of video of trials as truthful/deceptive.

In 2018 I graduated as a PhD in Experimental Particle Physics at the University of Sussex where I developed skills such as, problem solving, time management, coding (Python, C++, HTML, shell), to carry out data analysis of high rates and volumes of data collected by the ATLAS Experiment at the Large Hadron Collider (CERN, Geneva). During my PhD I have been invited to give talks at national (UK), and international (US), conferences; I have also participated in outreach activities to engage with the general public.

## Industrial Experience

### Leonardo

*Catania, Italy*

Data Scientist - AI Development

*Jan 2019 – Now*

- Data crawling: development of a Python tool to scrape LinkedIn jobs and user profiles
- Recommendation engine: development of a job-user recommendation system
- Computer Vision: development of a WebApp to perform real-time object detection using YOLO
- NLP: development of a deep-learning tool to extract the objects seized to criminal organizations from legal verdicts
- Social-network Analysis: named-entity extraction and sentiment analysis on Facebook-post comments
- Creation and management of micro-services on Azure

### Deckchair.com

*Brighton, UK*

Junior Data Scientist

*Jun – Aug 2018*

- Development of a statistical tool to select interesting images within a dataset;
- Design of a ML tool to classify grey sky and sunset images;

## Academic Experience

### University of Sussex

*Brighton, UK*

Post-Doctoral Research Fellow in Data Science

*Sep – Dec 2018*

- Development of ML model to classify videos of trials as Truthful/Deceptive
- Exploration of potential collaboration with other areas of research:
  - Evolutionary and Adaptive Systems Research Group
  - Industrial IT 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 optimizations 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 efficiency
- 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

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|---|---|
| **Data Science** | `sklearn, skimage, Keras, pandas, numpy, OpenCV, spaCy, NLTK, librosa, selenium, BeautifulSoup, Flask, Jupyter` |
| **Languages** | `Python, Bash, C/C++, HTML, LaTeX, Java, JavaScript` |
| **Versioning** | Git, SVN |
| **Database** | MongoDB, SQL |
| **DevOps** | Docker, Azure: WebApp, Function App, CosmosDB, EventHub, Azure CLI |
| **Office Suite** | Word, Excel, PowerPoint |
| **OSs** | Linux, macOS, MS Windows |
| **Teaching** | Data-science group mentor; Classical Physics and Electromagnetism; Properties of Matter |
| **Languages** | English (Fluent), Spanish (Fluent), Italian (Mother tongue), French (Basic) |

# Public Speaking

**DISCnet showcase** — *Royal Society, London, UK*

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

10-min talk on the ML tool developed for Deckchair.com

**HLT-UK Internal 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 Energy 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

# Awards

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|---|---|---|
| 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

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|---|---|---|
| Jun 2018 | **#ScienceOnBuses**, Participated in filming and engaged people 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

## International peer-reviewed conferences/proceedings

[6] 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*.

## PhD Thesis

[2] Fabrizio Miano and Fabrizio Salvatore. “Optimisation studies and data-driven background estimation in searches for the supersymmetric partner of the top quark with the ATLAS Detector at the LHC”. Presented 28 Sep 2018. Sept. 2018. URL: http://cds.cern.ch/record/2650559.

## Articles in peer-reviewed journals

[3] 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.

[4] 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].

[5] 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.

[6] 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).