FabrizioMiano

Research Fellow in Data Science

Contacts

fabriziomiano@gmail.com
+447478953812
Brighton, UK

Profiles

linkedin.com/in/fabriziomiano
sussex.ac.uk/profiles/356453
gitlab.com/fabriziomiano
fabriziomiano.wordpress.com

Computing

Python, C++, HTML, Bash, LaTeX,
Machine Learning,
Monte Carlo simulations,
MS Word, Excel, PowerPoint,
Mac OS, UNIX, Windows

Teaching

Associate Tutor of Classical
Physics and Electromagnetism;
Properties of Matter

Volunteering

HiSPARC,
#ScienceOnBuses,
Brighton Science Festival,
CERN Master class

Languages

Italian Mother tongue
English Fluent
Spanish Fluent
French Basic

Overview

By the end of my PhD I won a grant to work on an AI project: the development of an algorithm capable of selecting interesting images within a given dataset. I have spent 4 months working for Deckchair.com developing such an algorithm. In particular, two of the approaches that have been developed are; a statistical tool that exploits the structural similarity index (OpenCV, skimage); a machine learning tool (Scikit-Learn, keras, Tensorflow) for image classification. The project was timely delivered. As a Research Fellow in Data Science, I have moved to a new project: action recognition i.e. the classification of an action that is present in a given video.
During my PhD the main skills I have developed are related to dealing with high-rates and high-volumes of particle-particle collisions data collected with the ATLAS detector at CERN, Geneva. Signal extraction algorithms, signal-over-background optimisations (Python) modelling of regions of control (C++), and estimation of uncertainties (MS Excel) were at the heart of the analyses I have carried out. Ultimately, I have developed a monitoring tool (Python) for the ATLAS Inner Detector Trigger that employs the creation and the management of a database.

Research Experience

2018–Now **University of Sussex** Brighton, UK
Research Fellow in Data Science

- Development of an AI tool capable of performing action recognition (neural networks: CNN, DNN)
- Seek companies to work with on specific challenges
- Exploration of potential collaboration with other areas of research:
  - Evolutionary and Adaptive Systems Research Group
  - Data Science Research Group
  - Industrial Informatics and Signal Processing Research Group
  - Sensor Technology Research Centre

2018 **University of Sussex** Brighton, UK
Junior Data Scientist - Placement in collaboration with Deckchair.com
Detailed involvement:

- 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);

2014–2018 **University of Sussex - CERN** Brighton, UK / Geneva, Switzerland
Doctoral Position

- 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)

2013–2014 **Università degli Studi di Catania** Catania, Italy
MSc INFN-funded project
Monte Carlo simulations of protons emission and space-time characterisation in heavy-ion collisions

- 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

2015–2018 **PhD** in Experimental Particle Physics University of Sussex, UK / CERN, Switzerland
Optimisation studies and data-driven background estimation in searches for the supersymmetric partner of the top quark with the ATLAS Detector at the LHC

2009–2014 **MSc** in Experimental Nuclear Physics Università degli Studi di Catania, Italy
Protons emission and space-time characterisation in heavy-ion collisions

2005–2009 **BSc** in Physics Università degli Studi di Catania, Italy
Study of neutrons spectra emitted by Am-Be and Pu-Be radioactive sources

Communication Skills

2017 **15' Conference Talk** Phenomenology 2017, Pittsburgh, PA, USA
Searches for direct production of third generation squarks with the ATLAS detector

2016 **Conference Poster** ICHEP 2016, Chicago, IL, USA
The Design and performance of the ATLAS Inner Detector Trigger for Run 2 collisions at $\sqrt{s} = 13$ *TeV*

2015 **Poster** STFC HEP Summer School, Lancaster, UK
Search for direct pair production of the top squark in all-hadronic final states in pp *collisions with the ATLAS detector*

2014 **20' Graduation Talk** Università degli Studi di Catania, Italy
Emission of protons and space-time characterisation in heavy-ion collisions

Awards

2018 **Fellowship** University of Sussex, UK
STFC Impact Acceleration Account

2018 **Grant** University of Sussex in collaboration with Deckchair.com
DISCnet

2016 **Grant** University of Sussex, UK
Doctoral Overseas Conference Grant for Postgraduate Researchers

2015 **Scholarship** STFC, UK
4-year STFC-funded PhD scholarship in collaboration with CERN

2013 **Scholarship** INFN-LNS, Italy
1-year INFN-funded scholarship in collaboration with LNS

Publications

Articles in peer-reviewed journals

Performance of the ATLAS trigger system in 2015
The ATLAS Collaboration
The European Physical Journal C *77.5 (May 2017) p. 317. 2017*

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
The ATLAS Collaboration
JHEP *12 (2017) p. 085. 2017*

Search for dark matter produced in association with bottom or top quarks in $\sqrt{s}$ = 13 TeV pp collisions with the ATLAS detector
The ATLAS Collaboration
The European Physical Journal C *ICHEP2016 (2016) p. 856. 2016*

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

International peer-reviewed conferences/proceedings

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