

Alessandro Manfredini

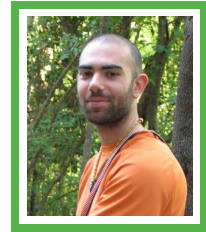
Curriculum Vitae

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Personal Details

Birth *November 11th 1985, Rome, Italy.*

Nationality *Italian.*

Education

2018–Present **Postdoctoral Fellow in Astroparticle Physics.**

University Of Zurich, Zurich, Switzerland.

2014–2018 **Postdoctoral Fellow in Astroparticle Physics.**

Weizmann Institute of Science, Rehovot, Israel.

2011–2014 **Ph.D. Student of International Max Planck Research School.**

Max-Planck Institute For Physics, Munich, Germany.

2008–2010 **Master of Science in Nuclear and Sub-nuclear Physics.**

University of Roma Tre, Rome, Italy. Grade: 110/110 magna cum laude.

Coordination and Awards

2016–2018 I was the XENON1T experiment's **statistical inference coordinator**.

2019 – DARWIN experiment's "electrodes and high voltage" sub-group coordinator.

2017 Awarded "*senior postdoctoral fellow*" at Weizmann Institute of Science.

Skills

My main expertise are in **statistics** and **data intensive analysis**. I am also experienced with automation software (PLC and SCADA systems programming). Proficient in C++, C#, Javascript and Python. Good knowledge of SQL and NoSQL databases, data streaming platform like Kafka as well as microservice orchestration with Kubernetes.

Second Postdoc

2018–Present I joined the group of Prof. Laura Baudis as co-leader of an R&D project for the future DARWIN dark matter detector ([more info here](#)). I am responsible for the design of a fully automated experiment monitoring and control system based on industrial Programmable Logic Controllers (PLC) and state of the art of big-data tools. I designed innovative IoT gateways ([OPC-Proxy](#) and [IoTpy](#)) that allows to connect data-taking sensors with the microservices infrastructure of our back-end. We use Kubernetes to orchestrate a series of services that includes Prometheus, Grafana, NodeJs and Apache Kafka. Finally, I designed the graphical user interface of our system, allowing to control the experiment with a simple click on the browser.

First Postdoc

2014–2018 I joined the [XENON](#) dark matter project in the group of Prof. Ran Budnik. The XENON collaboration consist of more than 100 physicist from all over the world.

Statistics: For two years I was co-leading the statistical inference team of the XENON1T experiment, where I performed hypothesis testing with computation of the confidence intervals and developed the statistical model of the experiment.

Data Analysis: I contributed with two independent Analyses. One performing dark matter search in the framework of Effective Field Theory. The other investigating inelastic dark matter scattering on ^{129}Xe isotope.

Slow Control: I was part of the XENON1T slow control developers team. My main contribution was to design the safety and motion control systems for a set of motors and belts used to move calibration sources in the experiment. I also developed the high voltage module controller, and the safety system of the experiment's water recirculation facility.

Research during Ph.D.

I joined the [ATLAS](#) experiment at CERN in 2011 under the supervision of Dr. Sandra Kortner. The ATLAS collaboration consist of thousands of physicist all over the world.

Thesis Title: "Search for Neutral MSSM Higgs Bosons in $A/h/H \rightarrow \tau^+\tau^- \rightarrow e\mu + 4\nu$ Decays with the ATLAS Detector."

Data Analysis My contribution was focused on the estimation of backgrounds and their systematics, the implementation of the probability model for hypothesis testing.

Software Skills

Data Analysis Proficient in C++, Deep knowledge of ROOT framework, ROOSTAT and RooFit. Good knowledge of Python and C#.

Automation PLC ladder diagram, structured text and SCADA programming.

Web Proficient in HTML, CSS, JavaScript, SQL and NoSQL database. Server-side (NodeJS/Django) and client-side programming. Good knowledge of Kubernetes and the Kafka streaming platform.

My Git Repositories

- [Xephyr](#) - A statistical framework (C++).
- [ImperaJS](#) - An app-state management framework (Javascript).
- [Brick-Element](#) - A web-component generator (Javascript).
- [OPC-Proxy](#) - A modular OPC gateway (C#).
- [JaS-HMI](#) - A Javascript Human-Machine-Interface framework.
- [IOTpy](#) - A Python framework to expose devices through REST API.

Language Skills

Mother tongue Italian

English Fluent - (CEFR C1)

Spanish Good understanding - (CEFR B1)

German Basics - (CEFR A2)