

VITTORIO BENCINI



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Italian, valid Swiss work permit



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Saint Genis-Pouilly (France)



<https://vitben.github.io/>

Data scientist with a PhD in physics and 8 years' experience in data analytics, statistics, and modelling. I leverage my quantitative skills to find smart and effective solutions to solve complex problems. Curious by nature, I like to learn new skills and to creatively integrate them with my day-to-day work.

KEY COMPETENCES

- ✓ Expert in statistical analysis and data modelling, implementing machine learning techniques.
- ✓ Excellent knowledge of data cleaning, pre-processing, and validation techniques.
- ✓ Experience in developing analytical solutions to highly complex problems.
- ✓ Advanced expertise in developing Python applications.
- ✓ Expert in application of several numerical optimization algorithms.
- ✓ Outstanding interpersonal, communication and presentation skills
- ✓ Experience in project management and coordination of international, cross-functional teams.
- ✓ Creative, problem solver, team-player.

WORK EXPERIENCE

Senior Researcher – Data science for Accelerators' Physics

10/2021 – Current, Oxford University/CERN

Responsible for conceiving, structuring, and developing AI solutions aimed to improve the operational performance of one of the key systems for the AWAKE experiment (100, members, 200 MCHF budget) at CERN.

- Served as a liaison between cross-functional, international groups, translating experimental requirements into technical specifications and ensuring effective communication. Timely built and delivered actionable and effective solutions in agreement with involved stakeholders.
- Designed AI/ML solutions for the optimization of the experiment performance. Leveraged state-of-the-art algorithms to automatically find the best operational settings, reducing the daily set-up time of the experiment from hours to few minutes.
- Developed Python packages for the online acquisition, cleaning, processing, and analysis of operational data. Deployed clean and flexible applications, used for daily set-up of the experiment, enforcing version control and software development best practices.
- Performed advanced statistical analysis on TB of complex, unstructured operational data, translating results into clear strategic insights. Presented to senior management, driving key upgrades to experimental setup (500 kCHF).

Junior researcher – Accelerators' Physics

03/2020 – 09/2021, CERN

Led the validation of a critical component of the most recent and advanced accelerator in the CERN complex (LINAC4).

- Defined the acceptance procedure and criteria to ensure adherence to operational requirements.
- Performed beam physics simulations to model particle dynamics within the accelerator. The simulations were used as reference to define the measurement campaign strategy.
- Supervised students of different levels (2 Bachelor, 1 Master's student, 1 PhD candidate) helping them in structuring and delivering results of the highest standard.

PhD candidate – Accelerator's Physics

10/2016 – 02/2020, CERN/TERA Foundation

Conception, design and launch of new particle accelerator for high precision particle therapy; liaised with multidisciplinary teams of scientists and engineers

PROJECTS

- Apply autoregressive LSTM neural networks to the problem of beam phase space tomography with missing angles. The algorithm outperformed the standard approach, improving the reconstruction accuracy of 50%.
- Use Fourier analysis to find correlations and patterns in the current ripples in power converters for a CERN beam transfer line. The results of the study drove a major upgrade of the beam line (500kCHF).
- Apply derivative-free optimisation algorithms (Genetic Algorithms, Powell, Nelder-Mead, Bayesian) for the online optimisation of the beam particle distribution injected in the AWAKE experiment.

EDUCATION

PhD in Accelerators' Physics

10/2016 – 02/2020, La Sapienza University (Rome, Italy)/CERN

Master's Degree in Nuclear Engineering

10/2012 – 10/2015, Politecnico di Milano (Milan, Italy)

LANGUAGES

Italian	Mother tongue
English	Fluent, written and spoken (Level C1)
French	Intermediate (Level B2)

Programming: Python (TensorFlow, Keras, Scikit-Learn, Pandas, Matplotlib, Numpy, Scipy), MATLAB, Octave, C++, SQL (basic), Tableau (basic)

Machine learning techniques: Recurrent Neural Networks (LSTM, GRU), Variational Autoencoders, Convolutional Neural Networks, Reinforcement Learning, Gaussian Processes,

Others Git, LaTeX, Linux, Jupyter Notebook, VSCode

CERTIFICATIONS

PMI – Project Manager for Professionals (PMP)

Application submitted – exam: June 2023

Coursera – Deep Learning Specialization

01/2023 – Current

INNOSUISSE – Business concept

09/2018 – 12/2018

Coursera – Machine Learning Specialization

12/2022 – 01/2023

IRA - Radiation Protection Expert

10/2021

DataQuest.io – Data Scientist in Python

03/2021 – 03/2022

EXTRA -CURRICULAR INFORMATION

- Instructor and administrator for the CERN boxing club. Within the club, I trained more than 200 boxing enthusiasts of different age, gender, cultural background, and nationality.
- Passionate cook, guitar player and traveller.