Luca Ratzinger
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SKILLS

- Statistical Modelling, Time Series Analysis, Methods for Data Science (Supervised/Unsupervised Learning, Graph-based Learning), Poisson Processes, Continuous-time Markov Chains, Spatial Statistics, Dynamical Systems.

Languages: English (CEFR Level: C2), Italian (Native), French (DELF B2)
Programming languages: Python (NumPy,Pandas,Matplotlib,Geopy,Scipy,Scikit-learn), R, Julia
Software: LaTeX, Microsoft Excel

EDUCATION

Imperial College London: G103 Mathematics (MSci 4YFT) (October 2021-June 2025)

- First Year Total (2021-2022): 84.40 / 100 (Dean's List : top 10%)
- Second Year Total (2022-2023): 86.51/100 (Dean's List : top 10%)

Liceo Ginnasio Luigi Galvani (September 2016-June 2021)

- Esame di Stato (Scientific International Italian-English Highschool Diploma): 100 / 100 cum laude

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PROJECTS

IROP (International Research Opportunities Programme) - Tokyo Institute of Technology, Takayasu Research Laboratory (July-August 2023):

- used Python to process large datasets of population GPS data to fit a discretised SIR activity model to the infectivity rate in Japan during the COVID-19 pandemic
- calculated infectivity rate depending on location (using fitted model parameters and 1km-grid used by the Japanese Statistics Bureau for spatial statistics)
- analysed population travel behaviour during the pandemic to measure effectiveness of States of Emergency declared by the Japanese government
- used the GeoPy library in Python to visualise results (mapping daily travel routes or location infectivity as a heatmap) as images and gifs
- wrote a report as a LaTeX document and presented my work to the research team in the Takayasu Research Laboratory

Time Series Analysis Project (Python) - IMPERIAL COLLEGE LONDON (December 2023):

- fit an autoregressive (AR) model to data in time series form (sea level measurements) using Yule-Walker and Least Squares methods and used estimated parameters to forecast future values
- used periodogram and cosine tapers to estimate periodograms of given time series to discover periodic behaviour present in data

Year 2 Research Project- IMPERIAL COLLEGE LONDON (June 2023):

- worked in a team to discover original mathematical results regarding the decomposition of the Hilbert Scheme, with a linear algebraic approach
- produced a report as a LaTeX document and presented our work orally

Department of Physics and Astronomy of the University of Bologna (June 2019):

- worked on a two-week group project focused on the physical theory regarding waves and their applications in geology. Interviewed public and produced a video presentation focusing on the key points of our research and the misunderstandings and gaps in the knowledge of the public.

EEE (Extreme Energy Events) Project - Liceo Ginnasio Luigi Galvani (2018-2020):

- In a research program coordinated by INFN (National Institute for Nuclear Physics) I helped record data on cosmic rays on a weekly basis using an MRPC (Multigap Resistive Plate Chamber) cosmic rays detector, built by past students of the school at CERN.
