

FRANCESCO DURAZZI

POSTDOC IN PHYSICS,
UNIVERSITY OF BOLOGNA

CONTACTS

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(BO), 40127, Italy

BIO

Born on 15/06/1994
in Fossombrone, PU, Italy (Age: 28)
2013: High school diploma
in classical studies (100L)
2016: Bachelor's degree in Physics
(110L), UniBO
2018: Master's degree in Physics (110L),
UniBO

Field of research

I have been active in the field of data analysis and physical modelling for Health and Social Sciences.

I've worked on the analysis of metagenomic populations and the modelling of infectious diseases. I'm currently working in the study of online social networks for the characterization of the infodemic relative to the SARS-CoV-2 pandemic and the behavioural changes on Twitter for people being infected by the virus.

I'm also exploring the usability of Deep Learning based language models for the embedding of viral proteins and the prediction of functional properties.

CERTIFICATES

English language: 7.0 on IELTS, British Council, 13 Feb 2016

Machine learning: Coursera,
27 Nov 2018

AWARDS

Scholarship: 2nd prize from Fondazione Occhialini, for best students in Orientation course in Physics, 01/2014. High school students were formed on Relativistic mechanics and examined by prof. N. Semprini Cesari (UniBo).

WORK EXPERIENCES

Postdoctoral researcher - University of Bologna 11/2019 - 30/1/2023

Group: applied physics for medicine and biology (Biophysics).
Supervisor: prof. D. Remondini
Topics and projects: complex networks and machine learning for genomics, health and society. Deep Natural Language Processing. Survival analysis. Epidemiological modelling.
Collaboration within the EU funded VEO project and Genomed4all project.

Visiting PhD student - EPFL 09/2021 - 12/2022

Digital Epidemiology Lab
Supervisor: prof. M. Salathé
Project: *Dynamics of social media behavior before and after SARS-CoV-2 infection*
Keywords: NLP, Deep Learning, Twitter data, time series, statistical testing

PhD in Physics (XXXV cycle) - University of Bologna 11/2019 - 30/1/2023

Supervisor: prof. D. Remondini
Thesis: *Data surveillance for infectious diseases: models, complex networks and machine learning*

EDUCATION

(LM) Alma Mater Studiorum - University of Bologna

*Master's degree in Physics,
curriculum of Applied Physics for Complex Systems and Medicine*
- **Final mark: 110 cum Laude, 14/12/2018**

- Topics and exams: complex networks, pattern recognition, statistical mechanics. Projects: data analysis, dynamic processes simulation for graphs, network analysis, image recognition with convolutional neural networks, multivariate regression with machine learning and applications to econometrics.

(LT) Alma Mater Studiorum - University of Bologna

Bachelor's degree in Physics
- **Final mark: 110 cum Laude, 28/10/2016**

Liceo Classico G.L. Storoni, Pesaro

High school in classical studies and humanities
- **Final mark: 100 cum Laude, 07/2013**

- Student representative in "Provincial Council of the Students of Pesaro e Urbino".

SUMMER SCHOOLS

DeepLearn Summer School

Las Palmas de Gran Canaria, Spain

- 25-29 July 2022

- Topics: representation learning, deep learning transformers and artificial data generation.

Behavioral Digital Trace Data in Response to the COVID-19 Pandemic

Online

- 26-31 July 2021

- Topics: computational social science, behavioral digital traces, social media data, epidemiological modelling, mobility data.

Summer school on Parallel Computing

CINECA, Bologna

- 13 - 24 May 2019

TEACHING

Officially qualified for teaching Physics in High School (A-20), since 2022

- Co-supervisor of 1 BD, 1 MD in Physics

- Piano Lauree Scientifiche 2022, 2023

University of Bologna

20 hours/year

Lab Tutor for High School students in the college choice orientation program. Topics: Python, Applied Physics, Machine Learning.

- Lectures for courses of "Complex Networks" and "Pattern Recognition", MD in Physics, 2021-2023

University of Bologna

4 hours/year

Supervisor of more than 20 students project for the final exams.

- Elective course module "Models and analysis for biomedical and epidemiological big data", Degree in Medicine

University of Bologna

6 hours

- Tutor for University students

Camplus College, Bologna

~ 100 hours

University students Tutor for physics and math exams preparation.

IT SKILLS

- 5 years experience in Python.

Python; Pandas, Sklearn, Scipy, igraph, Keras, Transformers. Projects: Bioinformatics, data fitting, DataFrame managing, Deep Learning on text, NLP, mathematical modelling, supervised and unsupervised ML.

- Familiarity with R and Matlab.

Projects: machine learning applied to economics, gene expression differential analysis.

Matlab; Projects: introduction to Machine Learning on Coursera, Neural Networks, pre-trained convolutional NN for image recognition (AlexNet), complex network analysis.

- Moderate knowledge of C++.

Projects: building of classes and resolution of simple problems in linear algebra (matrix operations and diagonalization).

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PUBLICATIONS

Scopus stats (30/05/2023): 138 citations, h-index 4

- F. Durazzi, M. Müller, M. Salathé and D. Remondini, **Clusters of science and health related Twitter users become more isolated during the COVID-19 pandemic**, *Scientific Reports*, 11, 2021.
- D. Gori, C. Reno, D. Remondini, F. Durazzi and M. P. Fantini, **Are We Ready for the Arrival of the New COVID-19 Vaccinations? Great Promises and Unknown Challenges Still to Come**, *Vaccines*, 9 (2), 2021.
- F. Durazzi, C. Sala, G. Castellani, G. Manfreda, D. Remondini and A. De Cesare, **Comparison between 16S rRNA and shotgun sequencing data for the taxonomic characterization of the gut microbiota**, *Scientific Reports*, 11, 2021.
- D. Gori, F. Durazzi et al., **Mis-tweeting communication: a Vaccine Hesitancy analysis among twitter users in Italy**, *Acta Biomedica*, 92, 2021.
- F. Durazzi, F. Pichard, D. Remondini and M. Salathé, **Dynamics of Social Media Behavior Before and After SARS-CoV-2 Infection**, *Frontiers in Public Health*, 10, 2023.
- F. Durazzi, M.D. Pezzani et al., **Modelling antimicrobial resistance transmission to guide personalized antimicrobial stewardship interventions and infection control policies in healthcare setting: a pilot study.**, submitted at *Scientific Reports*.