Pierfrancesco Beneventano

Personal Data

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Education

• PhD in Operation Research and Financial Engineering, Princeton University. **2020 – curr.**

• MSc in Operation Research and Financial Engineering, Princeton University. **2020 – 2022**
Theory of Machine Learning, Mathematical Optimization, Deep Learning
Research on implicit regularization in the training of machine learning models. Preprints:
- On the Trajectories of SGD Without Replacement.
- How Neural Networks Learn the Support is an Implicit Regularization Effect of SGD.

Advisers: Prof. Boris Hanin and Prof. Jason D. Lee.

• MSc in Mathematics, ETH Zurich. **2018 – 2020**
Statistics, Probability, Computational Mathematics, and Deep Learning
Theses (now ArXiv preprints):
- Deep neural network approximations for high-dimensional functions.
- Deep neural network approximations for high-dimensional first order Kolmogorov PDEs.

Advisers: Prof. Arnulf Jentzen and Prof. Patrick Cheridito.

• BSc in Mathematics, Università di Pisa. **2015 – 2018**
Computational Mathematics Curriculum
- Thesis on numerical methods for Markov chains (Italian). **Supervisor:** Prof. Dario A. Bini.
- INdAM Merit Scholarship, best 40 freshmen in math all-over Italy (2015–2018).

Industry and Research Experiences

• Applied Scientist Intern (Machine Learning Research) **2022 - 2023**
AWS AI Labs, Santa Clara, CA, USA.
Developing explainability techniques for machine learning for time-series modeling and anomaly detection. Working with Dr. Anoop Deoras, Dr. Laurent Callot, Dr. Baris Kurt, and Dr. Youngsuk Park.

• Machine Learning Research Intern **2022**
INRIA - SIERRA project-team, Paris, France
Working with Dr. Blake Woodworth in the team of Prof. Francis Bach on the stability of the training of neural networks.

• Machine Learning Research Intern **2020**
Daedalean AI, Zurich, Switzerland
Explainaibility of AI & Theoretical Guarantees for Neural Networks (Generalizability). My work was part of the project Concepts of Design Assurance for Neural Networks (CoDANN) in partnership with EASA, European Union Aviation Safety Agency, which will lead to the first guidelines for *AI certification in safety critical system*.

Other

Moderator & Organizer: XAI session, conference at OECD on *"Forecasting the future for sustainable development"*.
Organizer, Moderator, & Panelist: CEST-UCL Seminar series on responsible modelling.
Co-Founder & Social Media Chair: Princeton AI Club.

Teaching Experiences

Princeton University:
- Analysis of Big Data x2.
- Energy and Commodities Markets.
- Computing and Optimization for the Physical and Social Sciences.
- Optimization.

ETH Zurich:
- Numerical Methods for Partial Differential Equations.
- Computational Methods in Engineering and Applications.
- Translator and Proofreader of a book on Calculus.