Pierfrancesco Beneventano

PhD candidate at Princeton University

Researching on theory of deep learning.
Broadly interested in Machine Learning, its theory, and the math tools to develop it.

Personal Data

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Education

PhD in Operation Research and Financial Engineering, Princeton University, NJ, USA **2020 – curr.**
Mathematics of machine learning, Statistics, Computational Mathematics
- Summer research assistant (2021) of Prof. Boris Hanin.

MSc in Mathematics, ETH Zurich, Switzerland **2018 – 2020**
Statistics, Probability, Computational Mathematics, and Deep Learning

Theses:
- Deep neural network approximations for high-dimensional functions.
- Deep neural network approximations for high-dimensional first order Kolmogorov PDEs.

Supervisors: Prof. Arnulf Jentzen, Prof. Patrick Cheridito.

BSc in Mathematics, Università di Pisa, Italy **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).
- INdAM Summer School in Mathematics (2016, 2017).

Experiences

Machine Learning Research Intern **2020**
Daedalean AI, Zurich, Switzerland
- *Explainability 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*.

Teaching Assistant **2019 – 2020**
ETH Zurich, Switzerland
- Numerical Methods for Partial Differential Equations.
- Computational Methods in Engineering and Applications.
- Translator and Proofreader of a book on Calculus.

Courses for, among others: Physics MSc, Data Science MSc, CSE BSc, Mech. Eng. BSc.
Taught at the exercise lectures of the courses (both theory and C++ for problems.)

Coding skills

Proficient: *C, Matlab,* LaTeX.
Experiences: *C++, Python, R, Java.*

Languages

Native: Italian.
Fluent: English, 7.5/9 Academic IELTS

Other activities

Moderator and organizer **June 2021**

Conference: "Forecasting the future for sustainable development", OECD, Paris, France.

Organizing Committee Member, moderator of the session on Explainable AI, and social media/website manager for the conference: *"Forecasting the future for sustainable development: New Approaches to Modeling and the Science of Prediction"*, supported by INET, OECD, IBM, between others. I organized a lecture of Cynthia Rudin and a workshop of AI Ethics - IBM.

Selected Mathematical competitions

- Stats, 2015, 1st place at the Semifinal, 4th at the Final of Italian Statistics Olympiad.
- Math, 2013–2015, Finalist at the National Individual Competition.
- Math, Team Member (2013–2014) and Captain (2015) for the National Team Competition (ranked 4th-4th-3rd all-over Italy).
- Kangourou Math, 2012, 2014, and 2015, National finalist of the mathematical competition (scoring in the top 5 of my age for the first two years).

Others

- CEST member, we organize events and activities to strengthen the relationship between the academic world and civil society *and* to promote opportunities of involvement of young scholars and students in research (2021 – curr).
- Intel® Edge AI Scholarship, Udacity.
- Attended conferences on Complexity economics, Mathematics, Machine Learning.
- Soccer referee. (AIA - FIGC, 2013 – 2016).