Pierfrancesco Beneventano

PhD candidate at Princeton University

Broadly interested in Machine Learning, its theory, and the math tools to develop it.
Advised by Prof. Boris Hanin and Prof. Jason D. Lee.

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.
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). **Adviser:** Prof. Dario A. Bini.
- INdAM Merit Scholarship, best 40 freshmen in math all-over Italy (2015–2018).
- INdAM Summer School in Mathematics (2016, 2017).

Industry and Research Experiences

• ***Incoming*** **Applied Scientist Intern (Machine Learning Research)** **2022 - 2023**
Amazon Science & AWS, Santa Clara, CA, USA.
Working under Dr. Anoop Deoras and Dr. Laurent Callot on deep learning for time-series modeling and anomaly detection.

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

- *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 Experiences

Princeton University:
- Analysis of Big Data.
- Energy and Commodities Markets.

Courses for various STEM MSc and BSc.
Taught the precepts, graded homework, office hours.

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

Courses for: Physics MSc, Data Science MSc, CSE BSc, Mech.Eng. BSc.

Coding skills

Proficient: *C, Matlab.*

Experiences: *Python, R, PyTorch, Jax, ...*

Other

Moderator & Organizer: XAI session, conference at OECD on *"Forecasting the future for sustainable development"* (and much more as CEST member).

Organizer, Moderator, & Panelist: CEST-UCL Seminar series on responsible modelling.

Co-Founder & Social Media Chair: Princeton AI Club – Follow us on Twitter.