Francesco Caporali

Graduate student in Computational Mathematics

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🌐 homepage   ⬛ caporali   🔗 francescocaporali   📅 Last updated: May 24, 2022

Education

Laurea Triennale (B.Sc.) in Mathematics

University of Pisa

📅 September 2018 – May 2022   📍 Pisa, Italy

- Final grade: **110/110 cum laude** (a.y. 2020/21)
- Computational curriculum
- Core classes:
  - 📖 **Probability**
  - 📖 Scientific Computing
  - 📖 **Numerical methods for ODEs**
  - 📖 Algorithms and Data Structures
  - 📖 Operational Research
  - 📖 Computational Laboratory

Liceo Scientifico (scienze applicate)

Liceo Scientifico Paolo Ruffini

📅 September 2013 – July 2018   📍 Viterbo, Italy

- Final grade: **100/100**

Bachelor's Thesis

🔗 Reti neurali profonde: capacità di approssimazione e convergenza a processi gaussiani

Deep neural networks: approximation capabilities and gaussian behaviour

Supervisor: Prof. Dario Trevisan

Description: Reviewing some relevant theoretical results, we analyzed neural networks (NNs) as a formal model. We presented some versions of the density result of the functions that can be generated by NNs in L^p spaces and in $C(X)$ with X compact in $\mathbb{R}^k$. Then we studied the Gaussian asymptotic behavior of random NNs. The work includes experiments developed independently using Python's PyTorch module.

Extracurriculars

PHC Systems administrator

Department of Matemathics, University of Pisa

📅 December 2018 – May 2022   📍 Pisa, Italy

- Member of a group of technicians that mantains a network of Linux computers and offers various services for mathematics students
- Maintenance of the web server poisson.phc.dm.unipi.it

Early experiences

📅 2017 –2018

- Partecipation in several editions of the *Olimpiadi della Matematica*, both individually and in teams
- Partecipation in a Mathematics and Physics summer campus in Bardonecchia (TO)

Projects

Undergraduate works

University of Pisa

📅 2018 – 2021

- 🔗 **Scientific Computing:** a *preconditioned conjugate gradient algorithm* for GeneRank (Matlab).
- 🔗 **Algorithms and Data Structures:** implementation of a *urban route planner* (C++).
- 🔗 **Computational Laboratory:** implementation and analysis of *simulated annealing* (Python).

Skills

Programming Languages

Proficient:	**Basic:**
- Python (PyTorch)	- PHP
- Matlab	- Javascript
- C, C++	- OCaml

Markup Languages

Proficient:	**Basic:**
- LaTeX	- HTML

Other computer skills

- Microsoft Office
- Operating systems: Linux (all major distributions), Windows, macOS

Languages

- **Italian:** mother tongue
- **English:** B2 level

Certifications

First Certificate in English (FCE)

Cambridge English

📅 October 2017

- Grade: **178/190**

Academic Interests

- Probability theory
- Real Analysis
- Neural Networks
- Data Structures
- Programming

Other Interests

- Computers
- Running
- Board games and Videogames