

FRANCESCO CAPORALI

GRADUATE STUDENT IN COMPUTATIONAL MATHEMATICS

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📍 Via Roma 48, Oriolo Romano (VT), Italy
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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 Mathematics, University of Pisa

📅 December 2018 – May 2022 📍 Pisa, Italy

- Member of a group of technicians that maintains 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

- Participation in several editions of the *Olimpiadi della Matematica*, both individually and in teams
- Participation 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:

- Python (PyTorch)
- Matlab
- C, C++

Basic:

- PHP
- Javascript
- OCaml

Markup Languages

Proficient:

- LaTeX

Basic:

- 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