



# Calandriello Gennaro

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## Personal Profile

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I'm a master's student in Theoretical Physics at the University of Pisa. I'm particularly interested in Numerical Methods, Machine Learning, Cosmology, non-perturbative approaches to Fundamental Interactions and Web3. Highly motivated and detail-oriented, passionate about uncovering insights, exploring data and solving complex problems. Proficient in statistical modelling, machine learning, and data visualization, with extensive experience in Python.

## Education

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### University of Pisa

M.Sc. in Theoretical Physics

Pisa, Italy

October 2018 - Current

- **Research Thesis:** Anderson Localization in QCD Dirac spectrum
- **Relevant Courses:** General Relativity, Theories of Gravitation, Non-Perturbative QFT, Cosmology, Complex Systems, Numerical Methods for Theoretical Physics, Physics of Fundamental Interactions

### University of Salerno

B.S. Degree in Physics

Salerno, Italy

September 2014 - September 2018

- **Thesis:** Hydrogen Atom in Parabolic Coordinates: Symmetries and Conservation Laws
- **Relevant Courses:** Quantum Mechanics, Solid State Physics.
- **Final grade:** 102/110

### Pomponio Leto

Scientific High School Diploma

Teggiano, Italy

- **Final grade:** 100/100 e lode

## Academic Projects

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### Complex Systems:

- **Quantum Chaos Investigation in Partial Differential Schrödinger Equation in presence of certain potentials.** [\[GitHub\]](#)  
Keywords: PDE, Random Matrix Theory, Spectral Decomposition, time dependent SH, time independent SE, quantum billiards, eigenvalues statistics.

### Numerical Methods for Theoretical Physics:

- **Simulation of the 2D Ising Model with MCMC (Monte Carlo Markov Chain).** [\[GitHub\]](#)  
Keywords: Monte Carlo Methods, Metropolis-Hastings, Probability Distributions, Error Analysis, Bootstrap, Finite Size Scaling.
- **Simulation of a particle on a circle with PIMC (Path Integral Monte Carlo).** [\[GitHub\]](#)  
Keywords: Monte Carlo Methods, Metropolis, Path-Integral, Autocorrelation Functions, Topological Charge, Thermodynamics.
- **Simulation of PDE (Partial Differential Equations) with FDM (Finite Difference Methods).** [\[GitHub\]](#)  
Keywords: Euler, FTCS, ADI, Crank-Nicolson, Fokker-Planck.

## Skills

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### Programming

Python (NumPy, Matplotlib, Pandas, SciPy, SimPy, PyTorch, Scikit-learn, TensorFlow, LangChain, etc.),  
Vyper, Solidity

### Miscellaneous

Linux, Shell (Bash), LaTeX, Markdown, Microsoft Office, Git, CUDA

### Soft Skills

Problem-solving, Time Management, Teamwork.

## Interests

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**Neural Networks**

Gauge Equivariant Flow-Based Neural Networks architecture to sample configurations from a certain probability distribution through spectral flow on SU(3) matrices.

**Lattice Gauge Simulations**

Computation of various observables and order parameters in both SU(2) and SU(3) gauge theories, implementation of OverRelaxation, Metropolis, HeatBath algorithms, simulation of an SU(2) Higgs boson and SSB.

**Web3/BlockChain**

Working in a team of currently 2 people developing an Ethereum Full Node, part of Ethereum architectures to maintain the state of the network and contribute to security and decentralization.

**Classical Piano****Chess****Kung Fu**

Classical piano music student at Accademia di Musica Stefano Strata, Pisa.

Amateur Chess Player.

First technical degree of Wing Chun Kung Fu.

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**Languages****Italian**

Native

**English**

Professional working proficiency