



# Stefano Mangini

PHD STUDENT · THEORETICAL PHYSICS

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*Climate change is threatening our existence, and what you do makes a difference.  
Point is, what kind of difference do you want to make?*

## Introduction

I am a PhD student in Theoretical Physics in the Quantum Information Theory (QUIT) group at the University of Pavia, under the supervision of Prof. Chiara Macchiavello. I am very interested in the study of Quantum Technologies, and I wish to play an active role in their development. At the moment, my research is focused on Quantum Computation and Quantum Machine Learning for NISQ devices.

Interests: Quantum Computing, Quantum Machine Learning, Artificial Intelligence, Computation, Computer Science

## Anagraphics

**Nationality** Italian  
**Personal Address** Via Roma 25A, Putignano, 70017, Italy  
**Birth date** 20 January 1996  
**Personal Email** ✉ mangini.stfn@gmail.com

## Education

### University of Pavia

PHD IN THEORETICAL PHYSICS

- Currently researching on Quantum Computation and Quantum Machine Learning.

Pavia, Italy

Nov. 2019 - Ongoing

Supervisor: Prof. Chiara Macchiavello

### University of Trieste

MSC IN THEORETICAL PHYSICS

- Final Grade: 110/110 cum laude.

- Thesis: Continuous Quantum Neuron.

Supervisors: Prof. Fabio Benatti, Prof. Stefano Mancini

Study of a possible model for a Continuous Optical Quantum Neuron. In particular, starting from an optical circuit capable of implementing the dynamics of a Perceptron, various encoding for classical data into quantum states are studied. Ideal and real case with states comprising an energy bound are taken into account. Examples of entangled and superposition states were also considered.

Trieste, Italy

Oct. 2017 - Oct. 2019

### University of Trieste

BSC IN PHYSICS

- Final Grade: 110/110 cum laude.

- Thesis: The Ehrenfest model and the dynamics of neutral mutations in evolutionary genetics.

Supervisor: Prof. Edoardo Milotti

Study of the statistical mechanical model first introduced by Ehrenfest, applied to the description of the dynamics of a neutral mutation in a simulation of a group of cells. The research involved both theoretical aspects concerning the study of the statistical and biophysical model, and computational ones related to the programming of the simulation written in C++.

Trieste, Italy

Oct. 2014 - Jul. 2017

### High School "Majorana-Laterza"

SCIENTIFIC HIGH SCHOOL

- Final Grade: 100/100.

Putignano, Italy

Sep. 2009 - Jul. 2014

## Skills

<b>Soft skills</b>	Receptive, Communicative, Versatile, Cooperative, Creative, Autonomous
<b>Quantum Programming</b>	Qiskit, PennyLane (Basics)
<b>ML Programming</b>	Tensorflow & Keras
<b>Programming</b>	Python, Fortran, Bash, C/C++
<b>Scientific Software</b>	Latex, Mathematica, Matlab (Basics)
<b>Language</b>	Italian ( <i>mother tongue</i> ), English ( <i>very fluent</i> )
<b>Video Editing</b>	Final Cut Pro, Manim (Basics, for mathematical animations)

## Publications

- 2020 **Quantum computing model of an artificial neuron with continuously valued input data** S. Mangini, F. Tacchino, C. Macchiavello, D. Gerace and D. Bajoni, *Machine Learning: Science and Technology*, **1**(4): 045008. DOI: 10.1088/2632-2153/abaf98. [MLST, arXiv](#)
- 2019 **Continuous variable quantum perceptron** F. Benatti, S. Mancini and S. Mangini, *International Journal of Quantum Information*, **17**(08): 1941009. DOI: 10.1142/S0219749919410090. [IJQI, arXiv](#)

## Invited Talks

### Young Italian Quantum Information Science (YIQIS) 2020

INVITED SPEAKER

Talk: **Quantum computing models for artificial neurons**

Online event

Sept. 2020

## Conferences

### Quantum Techniques in Machine Learning (QTML) 2020

ATTENDEE

Series of seminars on Quantum Machine Learning.

Online event

Nov. 2020

### Young Italian Quantum Information Science (YIQIS) 2020

ATTENDEE

Series of seminars on Quantum Information from young Italian scientists.

Online event

Sept. 2020

### Hackathon on Cerebellum Modeling

ATTENDEE

Hackathon on computational neuroscience, dealing with theory and programming of cerebellum models.

Pavia, Italy

Jan. 2020

## Teaching

### General Physics 2

TEACHING ASSISTANT

Assistant of Prof Lorenzo Maccone for the course "Fisica Generale 2" (electromagnetism and electrodynamics) in the BSc in Mathematics.

Pavia, Italy

Oct. 2020-2021

## Experience

### Quantum Open Source Foundation (QOSF) Mentorship Program

MENTEE

I'm participating as a mentee in the Quantum Open Source Foundation (QOSF) Mentorship Program under the supervision of Antal Száva (Xanadu). Aim of the project is to produce open source codes for the quantum computing community.

Mentor: Antal Száva (Xanadu)

Oct. 2020 - Mar. 2021

### University of Trieste

STAGE

- Topic: Continuous Variable quantum computation.
- Acquired the necessary skills and knowledge for a quantum generalization of a Perceptron, as discussed in my Master Thesis.

Trieste, Italy

Feb. 2019 - Apr. 2019

### National Institute for Nuclear Physics (INFN)

INTERNSHIP

- Topic: Neural Networks Simulation in Mathematica.
- Deepened my knowledge of Neural Networks and Wolfram's Mathematica, by programming, implementing and optimizing a neural network algorithm (Neural Relax) into Mathematica.

Trieste, Italy

Feb. 2017 - Mar. 2017

## Extracurricular Activity

### Divulagation

ORGANIZATION AND CONTENT CREATOR

- *Pillole di Scienza*: Recorded a divulgation video published on Youtube about Bernoulli and Coandă effect, and their action on a ping pong ball suspended in an air flow. The video was created for a Physics divulgation project from University of Pavia.
- *Caffè dei Quanti*: Helped with organization, media communication, and advertisements (photos and short videos of the events), of a series of scientific divulgation events conceived by Prof. Angelo Bassi.
- *AISF*: Vice President of the local committee of the Italian Association of Physics Student (AISF). Organization and participation in several scientific divulgation events.
- *Mini-Maker Faire*: As a volunteer, helped with organization and acted as interpreter for english speaking Makers to italian visitors.

Multiple Locations

2014-2020

### Student Representative

DEPARTMENT OF PHYSICS

- Student Representative for Master of Science in Physics in the University of Trieste.

Trieste

2019

### Entrepreneurship

CONTAMINATION LAB

- Attended a School for University students in Trieste for promoting entrepreneurship and soft skills among students.

Trieste

2019