# Tommaso Pagliari

*Curriculum Vitae*

## About me

I was born in Cremona, Italy, on November 26, 1998. My expertise lies in theoretical physics, with a specific focus on Quantum Field Theory and Statistical Mechanics. I am interested in the potential impact of theoretical physics on modern society and contemporary technologies.


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## Work Experience

11/2023–02/2024 **Scientific Researcher**, *Danieli Group*, Italy.
Full-time apprenticeship as a scientific researcher at the Danieli steel science department, specializing in computational physics and its applications within the industrial sector.

## Education

2020–2023 **MSc in Theoretical Physics**, *University of Trieste*, Italy.
110/110 cum laude

2017–2020 **BSc in Physics**, *University of Trieste*, Italy.
109/110

2012–2017 **High-School Diploma**, *Liceo Classico e Scientifico M. G. Vida*, Italy.
100/100

## Masters Thesis

Title *Optimal paths in stochastic thermodynamics and information theory*

Supervisor **Prof. Sebastian Goldt**, *SISSA*, Italy.

Description We show a formal correspondence between the dynamic of Natural Gradient Descent and the geodesics that define the optimal protocols for a statistical mechanics problem. This duality might show new insights into the dynamic of learning for a neural network; in particular, we believe that such parallelism provides us with a way to update the learning rate in a thermodynamically optimal manner.

## Bachelor's Thesis

Title *Hamiltonian dynamics with Clifford's algebra*

Supervisor **Prof. Marco Budinich**, *University of Trieste*, Italy.

Description We introduce the Clifford's algebra and present the symplectic structure of the cotangent bundle of a Hamiltonian system. We analyze the theory of canonical transformations and report an elegant proof of Liuville's theorem that makes use of such a symplectic formalism. We aim to discuss the possibility of an invariant formulation of Hamiltonian mechanics through Clifford's algebra.

## Computer Skills

GNU/Linux Arch Linux, Debian

Programming `C++`, `Python`, `Fortran`, `C`, `bash/shell`.

Tools `vim`, `git`, `SageMath`, `ROOT`, LaTeX

## Training and Workshops attended

05/2023 **Workshop on Signatures of Non-equilibrium Fluctuations in Life**, *ICTP*, Italy.
The aim of the workshop is to discuss existing efforts on understanding non-equilibrium fluctuations using biological and physical methods. Click for more information.

2022–2023 **Large Deviations Lecture Group**, *SISSA & ICTP*, Italy.
Lectures are based on the book from Firas Rassoul-Agha and Timo Seppäläinen, called *A Course on Large Deviations with an Introduction to Gibbs Measures* and on the lectures notes by Hugo Touchette. Lecturers: Prof. Jean Barbier and Prof. Sebastian Goldt

2021 **Laboratory of Symbolic Calculus**, *University of Trieste*, Italy.
I attended and successfully completed the Symbolic Calculus Laboratory course, which included instruction in `Python` and the `SageMath` software, with certification awarded upon completion of the training program authorized by the Autonomous Region of Friuli Venezia Giulia.

2019–2020 **Internship**, *INFN*, Italy.
I worked on radiative effects and corrections for the COMPASS 2016 Liquid Hydrogen run at CERN. In particular, I run `C++` Monte Carlo simulations to reproduce the desired scattering processes. I used `ROOT`, the open-source framework for data analysis to analyze the obtained data. Supervisor: Prof. Andrea Bressan.

## Classes Taught

2022–2023 **Linear Algebra and Affine Geometry**, *University of Trieste*, Italy.
Tutor Assistant under Prof. Valentina Beorchia

2022–2023 **Elements of Mathematics**, *University of Trieste*, Italy.
Tutor Assistant under Prof. Chiara Pagani

## Languages

Italiano **Madrelingua**

English **Full professional level**

Français **Niveau élémentaire**

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Signature: Tommaso Pagliari Date: May 5, 2024