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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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: September 25, 2023