Lorenzo Luccioli
Mathematics PhD Student

06034, Foligno PG
☎ +39 328 9018205
✉ lorenzoluccioli@gmail.com

Education

December 2024 - Current — **International PhD college**, *University of Bologna*
I am part of the International PhD college of the University of Bologna, an academic and research track, complementary to the University's PhD programmes.

November 2024 - Current — **PhD in Mathematics**, *University of Bologna*
My studies will be focused on the applications of AI to mathematics, in particular to proof assistants like Lean 4.
Advisor: Prof. Giovanni Paolini

September 2022 - September 2024 — **Master of Science Mathematics**, *University of Bologna*
GPA: 30/30 cum laude, Final grade: 110/110 cum laude
Thesis title: Formalizing information theory in Lean 4: divergences, hypothesis testing and the data processing inequality
Advisors: Rémy Degenne and Prof. Andrea Pascucci

September 2022 - Current — **Collegio Superiore**, *University of Bologna*
Collegio Superiore is an institute of excellence of the University of Bologna. Admission and permanence are based exclusively on merit.

May - June 2023 — **Advanced School in Artificial Intelligence (ASAI)**, *University of Ferrara*
Final grade: 30/30 cum laude

September 2019 - July 2022 — **Bachelor of Science Mathematics**, *University of Bologna*
GPA: 30/30, Final grade: 110/110 cum laude
Thesis title: Sobolev embedding and Kolmogorov continuity theorem
Advisor: Prof. Andrea Pascucci

2014 - 2019 — **High School Diploma**, *Liceo Classico Federico Frezzi*, Foligno
Final grade: 100/100 cum laude

Academic Activities

December 2024 - March 2025 — **Master's thesis co-supervision**
Co-supervised the Master's thesis of Marco Petracci, titled: "Collaboration and Innovation in the Equational Theories Project: Formalizing Mathematics with Lean 4".

January 2025 — **Optimal Transport: from robust pricing to model calibration**, Folgarida, Italy
Winter school.

January 2025 — **Lean Together 2025**
Annual online meeting of the Lean community. I presented my work on the formalization of information theory in Lean 4.

December 2024 — **ASK Conference 2024**, *University of Bologna*, Bologna
A workshop about analysis and probability featuring talks by young mathematicians.

April 2024 - September 2024 — **Research internship**, INRIA, Lille
Working on the formalization of results in information theory in Lean 4, under the guidance of researcher Rémy Degenne. During my stay I also wrote my Master's thesis.

March 2024 — **LftCM2024**, CIRM, Marseille
Lean for the Curious Mathematician. A week-long event on the Lean theorem prover. During the event I worked on the formalization of Fermat's Last Theorem for exponent 3, currently being merged into the Lean mathematical library Mathlib.

January 2024	**Computer-verified proofs: 48 hours in Rome**, University of Rome Tor Vergata A three-day workshop dedicated to the use of the interactive theorem prover Lean 4.
October - December 2023	**Tutor of Bachelor course in Probability and Mathematical Statistics**, University of Bologna Assisted younger students by holding weekly meetings to solve exercises and clarify doubts. Moreover, I held a lecture introducing interactive theorem provers.
September 2023	**LftCM2023**, *University of Düsseldorf*, Düsseldorf, Germany Lean for the Curious Mathematician. A week-long event on Lean, during which I helped to formalize the gaussian distribution in Lean 4, my work was merged into Mathlib.
July 2022	**Assisted Research on VQR Scoring**, *University of Bologna* Informally assisted my thesis advisor in analyzing the results of the VQR, a national-level survey in Italy. We investigated some anomalies in the scoring distribution.

Work Experience

January 2025 - Current	**Part-time Lean Expert**, *Harmonic* Contributing to the formalization of mathematical problems in Lean 4.

Other Experiences

December 2024 - Febraury 2025	**Equational Theories project** I contributed to the completion of a formalization task in the project led by Terence Tao, aimed at formalizing equational theories of magmas in Lean 4.
November 2024	**LauzHack hackaton**, EPFL, Lausanne Participated in a 24-hour hackathon with more than 270 participants. My team won second prize at a challenge proposed by UBS, at which 12 teams participated.
May 2024 - July 2024	**PFR project** I contributed to a project led by Terence Tao, aimed at formalizing his recent work on the Polynomial Freiman–Ruzsa conjecture in Lean 4.
October 2023	**First Ascent Business**, Milan, Italy An event organized by Bending Spoons for young talents where we competed in teams to solve business related challenges during a 24 hour period.

Software

Python	Upper intermediate	MATLAB	Upper intermediate
Lean 4	Expert	Git/GitHub	Intermediate

Languages

Italian	Mother Tongue	English	Advanced
French	Elementary		

Awards

2021 and 2022	**Academic Merit Scholarship**, *from UniBo* Prestigious scholarship awarded to the 32 highest-achieving students of the School of Sciences at UniBo.
2019	**Merit Scholarship**, *from Fondazione Cassa di Risparmio di Foligno* In recognition of outstanding academic achievements during high school graduation.
2019	**IPO (International Philosophy Olympiad)** Represented Italy in the international phase after winning the first 3 selection rounds.