

Younes Mouhib

MSc Mathematics, ETH Zurich (Aug 2026) • quantitative research • systematic trading • energy & commodities • available September 2026

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French citizen (EU/EFTA free movement — Swiss B permit, no sponsorship needed) • born 21.08.1998

🌐 ysmouhib.github.io • 🐙 github.com/ysmouhib • 🔗 [LinkedIn](#) • 🎓 [Google Scholar](#) • 🆔 [ORCID](#) • 📄 [arXiv](#)

PROFILE

MSc Mathematics, ETH Zurich (graduating Aug 2026). Target fields: quantitative research, systematic trading, energy & commodities. Toolkit: optimisation (MILP, convex & network), statistics & probability, stochastic processes, Python. Two arXiv preprints in extremal combinatorics (record lower bounds on Hales–Jewett numbers). Available September 2026.

CORE SKILLS

Quantitative	statistics & probability; stochastic processes; time series; convex, network & integer / mixed-integer optimisation (MILP); graph theory; probabilistic methods; SAT / constraint solving; backtesting discipline (walk-forward, cost-aware, out-of-sample)
Programming	Python (NumPy, pandas, Matplotlib, pytest), SQL, MATLAB, Lean 4 (Mathlib), SAT solvers, HTML/JavaScript, Git & CI, $\LaTeX$ (TikZ, Beamer), Excel / Microsoft Office
Languages	French (native), English (fluent), Arabic (fluent), Spanish (conversational), Indonesian (intermediate), German (beginner, actively learning)

EDUCATION

ETH Zurich — MSc Mathematics

Sept 2023 – Aug 2026 (expected)

Master's thesis submitted 6 July 2026 • final grade $\approx$ 5.2–5.3/6 (expected)

Zurich, Switzerland

- Selected graded coursework (Swiss scale, 6 = max, 4 = pass; overall weighted coursework average $\approx$ 4.6/6): Algebra II 5.25, Structural Graph Theory 5.0, Algebraic Topology 4.75, Algebraic Geometry 4.5, Network & Integer Optimization 4.5, Convex Optimization 4.25.

EPFL — BSc Mathematics

Sept 2018 – July 2023

Overall average 4.54/6; final year 4.79/6 • diploma conferred Nov 2023

Lausanne, Switzerland

- Standout grades (6 = max): Measure & Integration 5.75, Ergodic Theory 5.75, Graph Theory 5.5, Stochastic Processes 5.25, Discrete Optimization 5.0.
- Bachelor thesis (12 ECTS), “On the Subadditive Ergodic Theorem and Its Applications” (advisors M. Colombo, L. Galeati) — graded 5.5/6.

Lycée Masséna, Nice — Classes préparatoires MPSI/MP*

2016 – 2018

Intensive mathematics & physics track (selective grandes-écoles programme) • top 10% of class

Nice, France

RESEARCH & PUBLICATIONS

MSc thesis, ETH Zurich (advisor: Prof. Dr. Lorenz Halbeisen)

submitted July 2026

“Improving Bounds on Hales–Jewett Numbers: Symmetric Colorings, SAT Solvers, Line-Family Variants, and Forcing Structures”

- New record lower bounds $HJ(3,3) \geq 22$ and $HJ(4,2) \geq 14$ (previous best 14 and 12) by exact symmetry reduction: colourings invariant under coordinate permutations collapse the search to a polynomial-size constraint model (< 600 certificate cells, mechanically checked).
- SAT solvers find the witnesses; correctness rests on dependency-free, hand-auditable re-verification — **hj-certificates** (Python): CI-tested SAT encoders and standalone verifiers reproducing every thesis bound in seconds.
- [1] Y. Mouhib (sole author), “One-Weight Colorings, the Symmetric Class, and Lower Bounds for Hales–Jewett Numbers”, [arXiv: 2607.02226](#) [math.CO], July 2026.
- [2] Y. Mouhib, L. Halbeisen, “Improved Lower Bounds for the Hales–Jewett Numbers via Symmetric Colorings”, [arXiv: 2606.22155](#) [math.CO], June 2026.

RESEARCH EXPERIENCE

Semester Project — ETH Zurich

2025

Supervised by Prof. Dr. Lorenz Halbeisen

Zurich, Switzerland

- “From Hypercubes to Sparse Graphs: Structural Translation of the Hales–Jewett Theorem via Monochromatic Stars.”
- Designed an induced construction mapping vertex colourings of hypercubes $[t]^n$ to edge colourings in sparse graphs, establishing a partial correspondence between monochromatic combinatorial lines and monochromatic stars.

Student Seminar — The Graph Regularity Method, ETH Zurich

2025

Organised by Prof. Dr. Benny Sudakov

Zurich, Switzerland

- Presented Szemerédi's Regularity Lemma, the triangle counting and removal lemmas, and their quantitative tower-type bounds (extremal graph theory and additive combinatorics).

Bachelor Project — EPFL

Supervised by Prof. Dr. Maria Colombo and Dr. Lucio Galeati

Feb – June 2023

Lausanne, Switzerland

- Studied Kingman's subadditive ergodic theorem and its applications to convergence problems in probability theory and dynamical systems.

SELECTED PROJECTS

near-momentum-bot — systematic strategy research (Python)

2026

Cost-aware backtesting & walk-forward validation on Binance spot data · [GitHub](#) · [live](#) · [simulator](#)

- Execution fees and slippage modelled on every fill, next-bar entries, worst-case tie-breaks; reports out-of-sample numbers only — built as a study in honest evaluation, not a performance claim.

brigade — verified multi-agent code generation

2024 – present

Multi-agent LLM system with machine-checked acceptance · [GitHub](#) · [live](#)

- Claude agents brainstorm, plan, formalise, prove and repair code; an independent Lean 4 proof verifier (with Mathlib) is the sole acceptance authority — the same verify-don't-trust discipline as the research pipeline. Browser UI for live runs.

hales-jewett-explorer — interactive thesis companion (web)

2026

Live Hales–Jewett grids in-browser; every counterexample machine-checked on the page · [GitHub](#) · [live](#)

- One-page web app to explore the grid $[t]^n$ in 2D/3D, generate and check symmetric colourings and line families, and visualise the forcing structures of the thesis live.

TEACHING & PROFESSIONAL EXPERIENCE

Course Instructor (PVK), Topology

June 2026

VSETH, ETH Zurich

Zurich, Switzerland

- Designed and delivered an intensive 4-day exam-preparation course in topology for 20+ students.
- Syllabus: general topology and an introduction to algebraic topology, including the fundamental group and the Seifert–van Kampen theorem.

Homework Tutor (grades 9–11)

July 2021 – Jan 2023

Collèges Villamont and St-Roch

Lausanne, Switzerland

- Supported pupils in mathematics and sciences; developed personalised study strategies to foster independent learning.

Student Mentor

Sept 2020 – Feb 2021

EPFL

Lausanne, Switzerland

- Mentored first-year students during the COVID-19 pandemic over a six-month period, providing academic guidance.

Science Outreach Volunteer

April 2022

Science Day in Thun, EPFL

Thun, Switzerland

- Supervised hands-on physics and mathematics activities at a one-day public outreach event.

Other employment alongside studies: FMEL Lausanne (warehouse & logistics), Tribeca Lausanne (waiter), Le Cailhau (waiter), Uber Lausanne (delivery courier), McDonald's Zurich (crew member), and private tuition (payslips available upon request).

INTERESTS

Chess — member of SKETHZ (ETH Zurich chess club), formerly EPFL La Dame Blanche; active on Project Euler and Mathraining

- classical & flamenco guitar (10+ years) · martial arts (10+ years) · literature