Corentin Lunel

Postdoctoral Researcher

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Born on December 24th, 1996
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Research Interests

I am motivated by topics at the interface of mathematics and theoretical computer science. My main interest is computational topology, which is a field in between low-dimensional topology and algorithms. My goal is to investigate the rich relationships between manifolds, knots, and graphs from a computational perspective.

Employment and Education

2024-2025 *INRIA UCA*: Post-doc in collaboration with Clément Maria within the Datashape team.

2021-2024 *LIGM, Université Gustave Eiffel*: PhD thesis: "Trees, Decompositions, and Knot Theory" under the supervision of Arnaud de Mesmay and Pierre Dehornoy. PHD defended on the 23rd of September 2024.

- Reviewers:
  - David Eppstein, University of California
  - Stephan Tillmann, University of Sydney
- Examiners:
  - Dominique Attali, Gipsa-lab
  - Livio Liechti, Université de Fribourg
  - Delphine Moussard, Aix-Marseille Université
  - Lionel Pournin, Université Sorbonne Paris Nord

2017-2021 *École Normale Supérieure de Lyon*, scholarship at ENSL:

2020-2021 ENSL M2 of theoretical computer science.
Internship with Arnaud de Mesmay at *LIGM*: "From decomposing graphs to sweeping knots".

2019-2020 ENSL M1 of Mathematics.
Internship with Olga Kravchenko at *Université Lyon 1*: "Le polynôme d'Alexander vu par les graphes bipartis".

2018-2019 ENSL M1 of theoretical computer science.
Internship with Uli Wagner at *Institute of Science and Technology Austria*: "Expander graphs and high dimensional Expanders".

2017-2018 ENSL L3 of theoretical computer science.
Internship with Arnaud de Mesmay at *Gipsa-lab*: "Réduction monotone de noeuds".

2014-2017 *Toulouse*, Higher school preparatory classes at Lycée Pierre de Fermat

Awards

2022 Best PhD student talk at ED MSTIC day.
2017 Junior Fermat prize for mathematical research.

Publications

Articles in conferences

1. *Hard Diagrams of Split Links*, with Arnaud de Mesmay and Jonathan Spreer, accepted in the 41th Symposium on Computational Geometry (SoCG 2025) https://arxiv.org/abs/2412.03372.

2. *Hopf Arborescent Links, Minor Theory, and Decidability of the Genus Defect*, with Pierre Dehornoy and Arnaud de Mesmay, Proceedings of the 40th Symposium on Computational Geometry (SoCG 2024, invited to a DCG special issue on SoCG 2024). https://arxiv.org/abs/2312.09094.

3. *A Structural Approach to Tree Decompositions of Knots and Spatial Graphs*, with Arnaud de Mesmay, Proceedings of the 39th Symposium on Computational Geometry (SoCG 2023). https://arxiv.org/abs/2303.07982.

Articles in journals

4. *Etude d'un invariant des noeuds alternés et mise en oeuvre informatique*, in French, with Hugo Fages and Quentin Rembert, Quadrature 112 (2019) p23-31.

Presentations

- Seminaire Rauzy, Marseille, France, 2025.
- Seminaire MC2, Lyon, France, 2025.
- Seminaire AlGCo, Montpellier, France, 2024.
- AATRN Seminar (online), November 2024.
- Geometry & Computing (poster), Marseille, France, 2024.
- International symposium of Computational Geometry, Athens, Greece, 2024.
- Journées du GdR IFM (poster), Grenoble, France, 2024.
- Journées Graphes et Algorithmes, Lyon, France, 2023.
- International symposium of Computational Geometry, Dallas, Texas, USA, 2023.
- SOS Workshop, Dagstuhl, Germany, 2023.
- ED MSTIC PhD Student day, best presentation, Paris, 2022.
- Journée de Géométrie Algorithmique (online), 2022.
- AMS-EMS-SMF Joint Congress of Mathematics, Grenoble, France, 2022.

Teaching

2022-2024	Algorithms course, exercise and practical sessions, 48 hours, ESIPE, first year.
2021-2023	Algorithms and tree data structures, exercise sessions, 22 hours, L2 course at Université Gustave Eiffel.
2021-2022	Lab math-info, exercise and practical sessions, 40 hours, L2 course at Université Gustave Eiffel.

Reviews

- I reviewed a paper for SoCG 2023.

Skills

Spoken languages

- French, native speaker.
- English, fluent (Certificate in Advanced English, C1).
- German, school level (B1).

Programming languages

- C
- Python
- OCaml
- LaTeX