

François CLÉMENT

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Education

University of Washington, Department of Mathematics

POSTDOCTORAL SCHOLAR

2024–

- Postdoctoral Scholar working with Stefan Steinerberger. I've been working on a range of combinatorial, optimization and number-theoretic problems.
- Teaching: Discrete Mathematical Modeling (MATH381), Linear Optimization (MATH407).

Sorbonne University

PHD STUDENT

2021–2024

- Supervisors: Carola Doerr, CNRS Research director, and Luís Paquete, at the University of Coimbra, Portugal.
- Title: “An Optimization Perspective on the Construction of Low-Discrepancy Point Sets”.
- Funded by a “Bourse MESRI”, 3-year PhD funding from the Ministry of Higher Education and Research.
- **Prix de Thèse EDITE 2025**, for best thesis in the EDITE doctoral school.

ETH Zürich

M. SC IN COMPUTER SCIENCE

2018–2021

- Specialization in theoretical computer science and optimization.
- Master's Thesis: “Erdős distinct distances problem over arbitrary fields”.

École Polytechnique

DIPLÔME D'INGÉNIEUR DE L'ÉCOLE POLYTECHNIQUE

2015–2018

- Computer Science track: algorithms, optimization, operations research.

Lycée Hoche

CPGE MPSI-MP*

2013–2015

- 2-year curriculum to prepare students for the entrance exams of the French engineering schools.

Professional Experience

- 2024– **Undergraduate teaching**, University of Washington. Full teaching responsibility for undergraduate classes.
- 2021–2024 **Undergraduate teaching**, Sorbonne University. 192 hours with groups of 30 students.
- 04-08/2018 **Research internship**, Cornell University. “Stochastic On-Time Arrival problem”.
- 2015–2016 **Military service during École Polytechnique**, Groupement de Gendarmerie des Vosges.

Publications

PUBLISHED

- F. Clément**, S. Steinerberger, *On the largest singular vector of the Redheffer matrix*, Linear Algebra and its Applications, volume 725, p96–114, 2025.
- F. Clément**, S. Steinerberger, *Failure of Orthogonality of Rounded Fourier Bases*, Indagationes Mathematicae, 2025.
- F. Clément**, S. Steinerberger, *Small gaps in the Ulam sequence*, Comptes-Rendus de l'Académie des Sciences- Série Mathématiques, volume 363, p941–949, 2025.
- F. Clément**, C. Doerr, K. Klamroth, L. Paquete, *Searching permutations for constructing uniformly distributed point sets*. Proceedings of the National Academy of Sciences U.S.A. 122 (14), 2025
Long version available at <https://arxiv.org/abs/2407.11533>
- F. Clément**, C. Doerr, K. Klamroth, L. Paquete, *Constructing Optimal L_∞ point sets*. Proceedings of the American Mathematical Society Series B, 12 (2025), 78–90. Long version available at <https://arxiv.org/abs/2311.17463>.

- F. Clément**, C. Doerr, L. Paquete, *Heuristic Approaches to Obtain Low-discrepancy Point Sets via Subset Selection*, Journal of Complexity, 83, 101852, 2024.
- F. Clément**, N. Kirk, F. Pausinger, *Partitions for stratified sampling*, Monte Carlo Methods and Applications, 2024, <https://doi.org/10.1515/mcma-2023-2025>.
- F. Clément**, D. Vermetten, J. de Nobel, A.D. Jesus, L. Paquete, C. Doerr, *Computing Star Discrepancies with Numerical Black-Box Optimization Algorithms*, Proc. of GECCO 2023, Lisbon, 2023.
- F. Clément**, T. Pham, *Distribution of distances in five dimensions and related problems*, SIAM Journal of Discrete Mathematics, Vol 36 No 3 pp. 2271-2281, 2022.
- F. Clément**, C. Doerr, L. Paquete, *Star discrepancy subset selection: problem formulation and efficient approaches for low dimensions*, Journal of Complexity, 70, 101645, 2022.
- F. Clément**, H. N. Mojarad, D. H. Pham, C.-Y. Shen, *On the two-parameter Erdős-Falconer distance problem in finite fields*, Bulletin of the Australian Mathematical Society, 107 (3), 502-506, 2022.

IN REVIEW

- F. Clément, *Outperforming the Best 1D Low-Discrepancy Constructions with a Greedy Algorithm*, Available at <https://arxiv.org/abs/2406.18132>
- A. Albers, F. Clément, S. Kiani, B. Sodt, D. Yifan, T. Zeng, *Approximately Jumping Towards the Origin*. Available at <https://arxiv.org/abs/2412.04284>
- F. Clément, D. Guyer, *Monotone Paths on Acyclic 3-Regular Graphs*. Available at <https://arxiv.org/abs/2508.02108>
- F. Clément, N. Kirk, A.B. Owen, T.K. Rusch, *On the optimization of discrepancy measures*. Available at <https://arxiv.org/abs/2508.04926>
- F. Clément, *Regular Structures in Kronecker Permutations*. Available at <https://arxiv.org/abs/2509.03782>

Research proposal contributions

2023	Franco-German PHC Procope project , Multi-objective Approaches for Generating Low-Discrepancy Point Sets with Well-distributed Projections	12 000 €
2022	Franco-Portuguese PHC PESSOA project , Algorithms and Complexity questions for the star discrepancy	4 000 €

Conferences and Presentations

- SIAM PNW 2025**: Organized a minisymposium on “Recent Trends in Optimization”.
- MCM 2025**: Co-organized the “Computational Methods for Low-discrepancy Sampling and Application” session with Nathan Kirk. *Avoiding L_∞ discrepancy optimization*.
- RO Seminar 2024**: Organized the RO Seminar at LIP6.
- 2021-2024**: Multiple presentations at the LIP6 RO team seminars: subset sampling, optimal point configurations, Kritzing sequence generalizations...
- November 2023, PGMO 2023**: French Optimization Days at EDF campus. *Optimal Sets for the L_∞ star discrepancy*
- August 2023, Dagstuhl Seminar 23351**: Algorithms and Complexity for Continuous Problems. Invitation only. *Constructing Low-Discrepancy Point Sets: Subset Sampling and Optimal Sets*
- July 2023, GECCO conference**: *Computing Star Discrepancies with Numerical Black-Box Optimization Algorithms*
- June 2023, MCM 2023**: Session organised by M. Gnewuch and F. Pausinger. *Subset Sampling for Low-Discrepancy Point Sets and Optimal Constructions*
- February 2023, Queen’s University Belfast Maths Seminar**. *Subset Selection for Low-Discrepancy Point Sets*

November 2022, PGMO 2022. *Subset Sampling for Low-Discrepancy Point Sets*

July 2022, MCQM 2022: Session organised by M. Gnewuch and F. Pausinger. *Subset Sampling for Low-Discrepancy Point Sets*

Teaching Experience

Spring 2026	MATH 381 Discrete Mathematical Modelling , UW undergraduate course covering a variety of algorithmic, mathematical and optimization tools to solve discrete problems. These include for example integer linear programming, Markov chains or flows. Twice per quarter in Winter and once in Spring, 3 hours per week per group plus office hours.	University of Washington (UW)
Winter 2025	MATH 407 Linear Optimization , UW undergraduate course covering the basic tools of linear optimization: LP formulation, simplex algorithm, duality, sensitivity analysis. 3 hours per week per group plus office hours.	UW
Fall 2025	MATH 407 Linear Optimization ,	UW
Spring 2025	MATH 407 Linear Optimization ,	UW
Spring 2025	MATH 381 Discrete Mathematical Modelling ,	UW
Winter 2025	MATH 381 Discrete Mathematical Modelling , Section A	UW
Winter 2025	MATH 381 Discrete Mathematical Modelling , Section B	UW
Fall 2023	Algorithms 2 , Exercise supervision and correction. 4 hours per week plus project examinations.	Sorbonne Université (SU)
Spr. 2023	Algorithms 1 , Exercise supervision and correction. 4 hours per week.	SU
Fall 2022	Algorithms 2 , Exercise supervision and correction. 4 hours per week plus project examinations.	SU
Fall 2022	Discrete Mathematics , Project supervision and examinations. 10 hours	SU
Spr. 2022	Algorithms 1 , Exercise supervision and correction. 4 hours per week.	SU
Fall 2021	Discrete Mathematics , Project supervision and examinations. 2 groups of 10 hours	SU
Fall 2021	Introduction to Python , Computer exercise sessions. 2 hours per week	SU

Supervision

Spring 2025	Woorim Lee, Xuan Zhang, Braeden Sodt, Cole Smidt , WXML project at the University of Washington, a quarter-long research project with undergraduate students. Optimizing the L_2 discrepancy via gradient descent.	University of Washington
Fall 2024	Rabea Freese , Master student, co-supervised with Kathrin Klamroth. Topic: Optimized fusion of low-discrepancy point sets,	University of Wuppertal
Summer 2024	Deyao Chen , Bachelor internship at LIP6. Topic: L2 subset selection.	University of Saint Andrews

Skills

Programming: C, C++, Java, Python.

Optimization software: Wide variety of solvers, frequent use of Gurobi.

English: Bilingual, A in the Cambridge Proficiency and OIB English mother-tongue.

Spanish: B2, C1/C2 class in École Polytechnique.

Peer Review

Journal of Complexity

Optimization and Engineering

IEEE Transactions on Evolutionary Computation

Theory of Probability and Mathematical Statistics

IEEE Signal Processing Letters