

Cédric Pilatte

Curriculum Vitae



St Giles'
Oxford OX1 3JP
United Kingdom
E pilatte@maths.ox.ac.uk
University of Oxford (UK)

Education

DPhil (PhD), *Univ. of Oxford*, Advisors: Ben Green and James Maynard. **2022–now**
Research areas: additive combinatorics and analytic number theory.

MSc. Mathematics, *École Normale Supérieure (ENS Ulm)*, Paris. **2019–2022**
The ENS Diploma is a 3-year research-oriented graduate degree.
Admitted through the International Selection in Sciences as one of the 10 scientific laureates.
Average grades /20: 19.11, 19.02 and 19. In 2021: research project with Timothy Gowers (Fields Medal 1998). In 2022: Master's thesis with James Maynard (Fields Medal 2022).

BSc. Mathematics, *University of Mons*, Belgium. **2016–2019**
La plus grande distinction (summa cum laude). Computer science as secondary subject.
Average grades /20: 18.82, 18.98 and 19.58. Received the *Prix de la Faculté des Sciences* in 2017 and the *Prix de Département de Mathématiques* in 2019.

Secondary Education, *Collège Sainte Gertrude*, Nivelles, Belgium. **2010–2016**
Selected to participate in the Olympiad training camps from 2013 to 2016.

Research publications

Unconditional correctness of recent quantum algorithms for factoring and computing discrete logarithms, *Preprint: arxiv.org/abs/2404.16450*. **2024**

Proof of Regev's number-theoretic conjecture underlying his improvement on Shor's algorithm.

Improved bounds for the two-point logarithmic Chowla conjecture, *Preprint: arxiv.org/abs/2310.19357 (75 pages)*. **2023**

Exponential improvement on bounds for self-correlations of multiplicative functions.

A solution to the Erdős-Sárközy-Sós problem on asymptotic Sidon bases of order 3, *Compositio Mathematica, Vol 160(6) (2024), 1418-1432*. **2023**

Solution to a 1993 Erdős problem on the existence of a Sidon set S such that $3S$ is cofinite.

New bound for Roth's theorem with generalized coefficients, *Discrete Analysis, (2022), 16*. **2021**

Proof of a conjecture of Shkredov and Solymosi using high-dimensional Bloom-Sisask techniques.

A note on optimal degree-three spanners of the square lattice, *Discrete Mathematics, Algorithms and Applications, (2021), 2150124*. **2020**

Computer-assisted disproof of an optimisation conjecture in discrete geometry (with D. Galant).

NP-completeness of slope-constrained drawing of complete graphs, *Journal of Computational Geometry, Vol 11(1) (2020), 371-396*. **2020**

On the sets of n points forming $n + 1$ directions, *Electronic Journal of Combinatorics, Vol 27(1) (2020), P1.24*. **2019**

Proof of a 1986 inverse conjecture of Jamison in combinatorial geometry.

Media

My research was featured in: Quanta Magazine ([link](#)), Science & Vie ([link](#)), Sueddeutsche Zeitung ([link](#)), Royal Dutch Mathematical Society ([link](#)). **2023**

Scholarships and Prizes

Royal Academy of Belgium, Cl. Sciences, Agathon de Potter Prize.	Dec 2024
Awarded “for your remarkable solution to the Erdős-Sárközy-Sós problem in number theory.”	
St John’s College, Oxford, North Senior Scholarship.	Sep 2024
Awarded to one College student in the MPLS (Sciences) division for “excellence in research”.	
Vocatio – public utility foundation, Vocatio Laureate 2024 (link).	Jun 2024
“Vocatio recognises and rewards excellence in a variety of fields, while encouraging the laureates to continue to surpass themselves and strive for excellence in everything they do.”	
Jane Street, Graduate Research Fellow 2024 (link).	Feb 2024
The 8 fellowships “support exceptional doctoral students currently pursuing a PhD in computer science, mathematics, physics, or statistics.”	
University of Oxford, Saven Scholarship.	Jun 2022
University of Oxford, Mathematical Institute Scholarship.	May 2022
University of Mons, Initiation to Research Scholarship.	Jul-Aug 2019
École Normale Supérieure (ENS), International Selection Scholarship.	Feb 2019
Fondation Mathématique Jacques Hadamard, Sophie Germain Master Scholarship, I declined the scholarship in favor of the ENS.	Feb 2019

Experiences

Additive combinatorics workshop, Int. Cent. Math. Sc., Edinburgh.	Jul 2024
Pointwise ergodic theory and connections II, University of Bristol.	Jun 2024
Additive combinatorics summer school, Erdős Center, Budapest.	Jun 2024
Responsible for the problem session on linear methods with Thomas Bloom.	
Structure & randomness (Tim Gowers), Isaac Newton Inst., Cambridge.	Apr 2024
Analytic number theory & interfaces (Roger Heath-Brown), Oxford.	Jul 2023
Random matrices (Jon Keating), University of Bristol.	Jul 2023
Institute for Advanced Study (IAS), Invited Visitor, Princeton.	Sep 2022
Celebration of analytic number theory (Andrew Granville), Montréal.	Sep 2022
Summer school in analytic number theory, IMJ-PRG, Paris.	Jun-Jul 2021
Research internship with Timothy Gowers, Collège de France.	Feb-Jun 2021
Heidelberg Laureate Forum, (Online).	Sep 2020, Sep 2021
Conference where 200 selected young researchers in Math and Computer Science interact with recipients of the most prestigious awards (such as Abel Prize, Fields Medal, Turing Award).	
PROMYS Europe (Counsellor), University of Oxford.	Jul-Aug 2018
I mentored three talented participants, while studying Dwork’s proof of the 1st Weil conjecture.	
Brussels Summer School in Mathematics, ULB.	Aug 2017, Sep 2018
Modern Mathematics Summer School, Jacobs University, Bremen.	Jul 2017
Two intensive weeks of lectures and discussions with leading mathematicians (e.g. John Conway).	
PROMYS Europe (Participant), University of Oxford.	Jul-Aug 2016
About 20 students were selected to explore challenging mathematics together for six weeks.	

Talks

Conferences and seminars (invited speaker)

Improved bounds for two-point correlations of multiplicative functions (contributed talk), 9th European Congress of Mathematics, Seville.	Jul 2024
Improved bounds for the two-point Chowla conjecture at almost all scales, Canadian Number Th. Association XVI, Fields Institute, Toronto.	Jun 2024
Recent progress on factoring with quantum computers (contributed talk), Belgian Mathematical Society 2024 PhD Day, Antwerp.	May 2024

Improved bounds for Chowla's conjecture with logarithmic weights , <i>UCL Combinatorics Seminar, London.</i>	Apr 2024
Factoring integers with quantum computers , <i>Graduate Research Fellowship Workshop, Jane Street, New York.</i>	Apr 2024
Stronger bounds for logarithmic correlations of multiplicative functions , <i>Bordeaux Number Theory Seminar.</i>	Mar 2024
Improved bounds for the logarithmic Chowla problem , <i>RTAEN Meeting, Institut Henri Poincaré, Paris.</i>	Mar 2024
Quantitative bounds for a weighted version of Chowla's conjecture , <i>Oxford Junior Number Theory Seminar.</i>	Jan 2024
Recent progress on binary correlations of the Liouville function , <i>Shandong University Number Theory Seminar.</i>	Jan 2024
Graph eigenvalues and the logarithmic Chowla conjecture in degree 2 , <i>Warwick Junior Number Theory Seminar.</i>	Jan 2024
Improved bounds for two-point correlations of the Liouville function , <i>WOMBL Meeting, University of Cambridge.</i>	Jan 2024
A combinatorics problem of Erdős solved with function field number theory , <i>Bristol Combinatorics Seminar.</i>	Oct 2023
An application of number theory over function fields to combinatorics (contributed talk), <i>Conf. for Young Number Theorists in Bonn.</i>	Sep 2023
An Erdős problem on additive Sidon bases: perverse sheaves in action , <i>Stanford Analytic Number Theory Student Seminar.</i>	May 2023
Combinatorics goes perverse: an Erdős problem on additive Sidon bases , <i>Oxford Junior Number Theory Seminar.</i>	May 2023
The inverse slope problem and additive combinatorics , <i>Mathematics Seminar, ENS Paris.</i>	Apr 2020
Stretch factor of convex curves , <i>Math and Computer Science Junior Seminar, University of Mons.</i>	Oct 2019
The minimum dilation problem (contributed talk), <i>Young Mathematicians Symposium of the Greater Region, University of Liège.</i>	Sep 2019
<i>Talks on research by others</i>	
Pairs of commuting integer matrices (following Browning, Sawin and Wang), <i>Oxford Analytic Number Theory Reading Seminar.</i>	Nov 2024
Convolutions of integer sets: a galaxy of (mostly) open problems , <i>Oxford Mathematical Institute, North meets South Colloquium.</i>	Jan 2024
Quantitative equidistribution of $\pi(x)$ in residue classes (following Tao), <i>Oxford Analytic Number Theory Reading Seminar.</i>	Oct 2023
A diophantine inequality of Robert and Sargos , <i>Oxford Analytic Number Theory Reading Seminar.</i>	May 2023
The fascinating world of prime numbers: an insight into the work of James Maynard , <i>Palace of the Academies (Brussels).</i> Invited speaker at the Recent Breakthroughs Symposium of the Belgian Mathematical Society.	Mar 2023
The logarithmic Chowla conjecture (following Helfgott-Radziwiłł), <i>RTAEN Meeting, Institut Henri Poincaré, Paris.</i>	Dec 2022
Analytic number theory: the additive perspective , <i>ENS Paris.</i>	Jun 2022
On the largest subsets of $\{1, 2, \dots, n\}$ without arithmetic progressions of length 3 , <i>Algebra and Logic Seminar, University of Mons.</i>	May 2021
The de Rham-Witt Complex (prep. with Luc Illusie), <i>Banyuls, France.</i>	Nov 2019

Primes everywhere, *Math Department Seminar, University of Mons.* Jun 2019
Addi(c)tive combinatorics, *Model Theory Seminar, University of Mons.* Jun 2019

Poster

The Inverse Slope Problem and Additive Combinatorics, *British Mathematical Colloquium, Glasgow (Online).* Apr 2021

Referee

Peer-review

Annals of Mathematics, Journal of the American Mathematical Society, International Mathematics Research Notices, Discrete Analysis, Discrete & Computational Geometry.

Other

Mathematical Reviews - AMS.

Outreach

Fibonacci Math Programme, *Balliol College, Oxford.* Feb-Mar 2024 & 2025

Online sessions for disadvantaged high school students in number theory and combinatorics.

The distribution of prime numbers, *King's High School, Warwick, UK.* Feb 2024

Audience-friendly presentation the analytic study of prime numbers for their Math Society.

An excursion in additive combinatorics, *Tonbridge School, UK.* Oct 2023

Informal discussion with high-school students and accessible talk on my research.

The fascinating world of prime numbers, *ENS, Paris.* May 2023

Invited to speak about James Maynard's work at the Journées ENS-CPGE.

The game of Set and the polynomial method, *ENS, Paris.* May 2022

With 50 high-school students, using the game of Set as an invitation to modern mathematics.

The cap set problem, *University of Oxford.* Aug 2019

Guest speaker for the PROMYS Europe programme.

The cap set problem and the polynomial method, *University of Mons.* Jul 2019

Two-day activity introducing high school and university students to research-level mathematics.

Expository article, *Un problème de pentes, Losanges, N° 44, p20-26.* Mar 2019

Olympiad training, Wépion, Belgium. 2017-now

I give courses in number theory for the future Olympiad contestants.

Contests

Individual

French Federation of Mathematical Games (FFJM), *Belgium*, 1st place. 2017

International Mathematical Olympiad (IMO), *Hong-Kong.* 2016

Selected in the Belgian team, but participated to PROMYS Europe instead.

Benelux Mathematical Olympiad, *Soest, Netherlands.* 2016

Belgian Mathematical Olympiad, 1st prize in 2016. 2012–2016

Team

Northwestern Europe Regional Contest, *Eindhoven, Netherlands.* 2018

Battle Dev (online algorithms competition), *France*, 1st, then 2nd. 2017, 2019

Benelux Algorithm Programming Contest, 3rd in 2018. 2017, 2018

Watson Hackathon (artificial intelligence), *IBM Brussels.* 2017

Languages

French (native), **English** (highly proficient), **Dutch** (good command).