

## Kai (Steve) Fan

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### CONTACT INFORMATION

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### RESEARCH INTERESTS

Analytic number theory: the distribution of primes, zeta and  $L$ -functions, asymptotic and statistical behaviors of arithmetic functions

### EDUCATION

#### **Dartmouth College**

Ph.D. Candidate, Mathematics, November 2023  
M.A. in Mathematics, February 2020

#### **Southeast University**

B.S. in Mathematics and Applied Mathematics, June 2015

### EMPLOYMENT

#### **Max Planck Institute for Mathematics**

Postdoctoral fellow, starting January 2024

### PUBLICATIONS AND PREPRINTS

- [1] *LCM products and  $\kappa$ -colossally abundant numbers* (with Mitsuo Kobayashi and Grant Molnar), manuscript in preparation.
- [2] *The shifted prime-divisor function over shifted primes*, preprint, 2024. [arXiv:2406.05217](https://arxiv.org/abs/2406.05217)
- [3] *Shifted-prime divisors* (with Carl Pomerance), submitted, 2024. [arXiv:2401.10427](https://arxiv.org/abs/2401.10427)
- [4] *Weighted Erdős–Kac theorems via computing moments*, accepted by Acta Arith., 2023. [arXiv:2306.11289v9](https://arxiv.org/abs/2306.11289)
- [5] *On a super telescoping sum representing binomial coefficients*, to appear in Rocky Mountain J. Math., 2023.
- [6] *Numerically explicit estimates for the distribution of rough numbers*, J. Number Theory **260** (2024), 120–150.
- [7] *An inequality related to the sieve of Eratosthenes* (with Carl Pomerance), J. Number Theory **254** (2024), 169–183.
- [8] *An inequality for the distribution of numbers free of small prime factors*, Integers **22** (2022), #A26, 12 pp.
- [9] *The second largest Balaban index (sum-Balaban index) of unicyclic graphs* (with Wei Fang, Yubin Gao and Zhongshan Li), J. Math. Res. Appl. **37** (2017), 391–403.
- [10] *A finite difference scheme for semilinear space-fractional diffusion equations with time delay* (with Wanrong Cao, Zhaopeng Hao and Zhizhong Sun), Appl. Math. Comput. **275** (2016), 238–254.

MISCELLANEOUS  
NOTES

- [1] *The Davenport–Halberstam theorem for Möbius function*
- [2] *Harmonic sums in arithmetic progressions*
- [3] *The Erdős–Kac theorem*
- [4] *The asymptotic for the second moment of  $\zeta(s)$  on the critical line*
- [5] *On Selberg’s proof of Dirichlet’s theorem on arithmetic progressions*
- [6] *A short note on convex functions*
- [7] *The Copeland–Erdős theorem on normal numbers*
- [8] *On geometric proofs of theorems on sums of squares*
- [9] *Vinogradov’s estimate for the least quadratic non-residues*
- [10] *Note on chapter 26 of Davenport’s multiplicative number theory*
- [11] *The Erdős–Ginzburg–Ziv theorem*
- [12] *Summability and the closed graph theorem*

TALKS

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|-----|------|---|
| May | 2024 | <i>Counting shifted-prime divisors</i> , Intercity Number Theory Seminar, Utrecht University  |
| May | 2024 | <i>Geometry of numbers with applications to linear forms</i> , The Circle Method Seminar, MPIM  |
| Mar | 2024 | <i>The singular series in Waring’s problem (II)</i> , The Circle Method Seminar, MPIM   |
| Mar | 2024 | <i>The singular series in Waring’s problem (I)</i> , The Circle Method Seminar, MPIM  |
| Feb | 2024 | <i>Counting shifted-prime divisors</i> , Algebra and Number Theory Seminar (virtual), Dartmouth College                               |
| Feb | 2024 | <i>Counting shifted-prime divisors</i> , Number Theory Lunch Seminar, MPIM  |
| Oct | 2023 | <i>Arithmetic combinatorics: integer partitions and sequences</i> , Graduate Student Seminar, Dartmouth College                       |
| Apr | 2023 | <i>Building finite fields through counting</i> , Graduate Student Seminar, Dartmouth College  |
| Feb | 2023 | <i>Quadratic reciprocity via linear algebra</i> , Graduate Student Seminar, Dartmouth College   |
| Nov | 2022 | <i>Roth’s theorem on arithmetic progressions</i> , Graduate Student Seminar, Dartmouth College  |
| May | 2022 | <i>Gaps between consecutive primes</i> , Graduate Student Seminar, Dartmouth College  |
| Apr | 2022 | <i>LCM products and <math>\kappa</math>-colossally abundant numbers</i> , Algebra and Number Theory Seminar, Dartmouth College        |
| Mar | 2022 | <i>The Prime Number Theorem: From the classical method to the pre-tentious approach</i> , Graduate Student Seminar, Dartmouth College |

TALKS	Nov	2021	<i>Zeros of the Riemann zeta-function and Hardy's theorem</i> , Graduate Student Seminar, Dartmouth College Notes
	Apr	2021	<i>The transcendence of <math>e</math> and <math>\pi</math></i> , Graduate Student Seminar, Dartmouth College Slides
UNDERGRADUATE TALKS & REPORTS	June	2015	<i>Ruled surfaces and isometric correspondence</i> , Southeast University
	March	2015	<i>Semilinear space-fractional diffusion equations with time delay and numerical modeling</i> , Southeast University
TEACHING AT DARTMOUTH	Fall	2022	Instructor, Math 11: Accelerated Multivariable Calculus
	Fall	2021	Instructor, Math 1: Introduction to Calculus
	Summer	2020	Lecturer, Math Camp: Exploring Mathematics
	Spring	2020	TA, Math 13: Multivariable Calculus
	Fall	2019	TA, Math 23: Differential Equations
	Winter	2019	TA, Math 3: Introduction to Calculus
	Fall	2018	TA, Math 3: Introduction to Calculus
ATTENDED NUMBER THEORY COURSES AND SEMINARS	Jan	2023	Joint Mathematics Meetings
	2021–Present		Number Theory Web Seminar
	2018–Present		Algebra and Number Theory Seminar, Dartmouth College
	Nov 2021–Present		Webinar in Additive Combinatorics
	Oct 2021		2021 Maine-Quebec Number Theory Conference
	May–Aug 2021		Harmonic Analysis and Analytic Number Theory (Dual Trimester Program), Hausdorff Center for Mathematics
	Feb 2021–Present		Virtual Brazilian Number Theory Seminar
	June–July 2021		Summer School in Analytic Number Theory (Virtual Sessions)
	May 2021		Rational Points and Galois Representations (Online Workshop)
	Winter 2021		Math 790: Introduction to Transcendence Theory, Duke University
	Winter 2021		Math 105: Topics in Number Theory, Dartmouth College
	Fall 2020		Math 249A: Topics in Number Theory (virtual), Stanford University
HONORS AND AWARDS	2018–2023		Dartmouth Graduate Fellowship, Dartmouth College
	2013–2014		National Undergraduate Scholarship (Nationally Top 1%), Ministry of Education of China
	2011–2014		Undergraduate Academic Scholarship, Southeast University
SKILLS AND ACTIVITIES	Languages: Mandarin Chinese (Native Speaker), English (Fluent)		
	Computer Skills: C, C++, Python, HTML, L <sup>A</sup> T <sub>E</sub> X, Mathematica, MATLAB		
	Assisted in reviewing problems for 2020–2021 Utah Math Olympiads		