Kai (Steve) Fan

CONTACT

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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 κ-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

[3] *Shifted-prime divisors* (with Carl Pomerance), submitted, 2024. arXiv:2401.10427

[4] *Weighted Erdős–Kac theorems via computing moments*, accepted by Acta Arith., 2023. arXiv:2306.11289v9

[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

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

Talks

Nov	2021	*Zeros of the Riemann zeta-function and Hardy's theorem*, Graduate Student Seminar, Dartmouth College
Apr	2021	*The transcendence of e and π*, Graduate Student Seminar, Dartmouth College

Undergraduate Talks & Reports

June	2015	*Ruled surfaces and isometric correspondence*, Southeast University
March	2015	*Semilinear space-fractional diffusion equations with time delay and numerical modeling*, 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: Calculus
Fall	2018	TA, Math 3: 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 Brazilan 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
Spring 2019	Math 105: Topics in Number Theory, Dartmouth College

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, LaTeX, Mathematica, MATLAB

Assisted in reviewing problems for 2020–2021 Utah Math Olympiads