

# Anurag Sahay

## Curriculum Vitae

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### Education

- 2018–2023 **Doctor of Philosophy, Mathematics**, University of Rochester (UoR).  
(expected) Doctoral Adviser: Prof. Steven Gonek.
- 2018–2020 **Master of Arts, Mathematics**, University of Rochester.
- 2011–2016 **B.S.–M.S. (Dual Degree), Mathematics and Scientific Computing**,  
Indian Institute of Technology, Kanpur (IITK).  
Graduated with Distinction; Minors in: (1) Theory of Computing, and (2) Literature.

### Research Interests

Analytic and probabilistic number theory, additive combinatorics, spectral (hyper)graph theory, discrete geometry, and applications to theoretical computer science.

### Publications

1. Alex McDonald, Brian McDonald, Jonathan Passant, and Anurag Sahay, *Distinct distances from points on a circle to a generic set*, **Integers**, 21:Paper No. A55, 2021., arXiv:2005.02951.
2. Anurag Sahay, *Moments of the Hurwitz zeta function on the critical line*, **Math. Proc. Cambridge Phil. Soc.**, First View: 1–31, 2022., doi:10.1017/S0305004122000457, arxiv:2103.13542.
3. Winston Heap, Anurag Sahay, and Trevor D. Wooley, *A paucity problem associated with a shifted integer analogue of the divisor function*, **J. Number Theory**, 242:660–668, 2023., doi:10.1016/j.jnt.2022.05.006, arXiv:2108.00287.

### Preprints

- Brian McDonald, Anurag Sahay, and Emmett L. Wyman, *The VC dimension of quadratic residues in finite fields*, 2022., arxiv:2210.03789.

### Teaching (as Instructor-of-Record at UoR)

- Spring '23 Math 165: Linear Algebra w/ Differential Equations, (*upcoming*).
- Summer '22 Math 165: Linear Algebra w/ Differential Equations.
- Spring '22 Math 143: Calculus III.
- Summer '21 Math 142: Calculus II.

## Research Talks

### Upcoming Talks.

- 04 Jan 2022 AMS Contributed Paper Session, Joint Mathematical Meetings, Boston  
**The value distribution of the Hurwitz zeta function with irrational shifts.**
- 01 Dec 2022 Weekly Seminar, PIMS CRG on  $L$ -functions in Analytic Number Theory  
**The VC-dimension of quadratic residues in finite fields.**
- 18 Nov 2022 Discrete Math and Combinatorics Seminar, University of South Carolina  
**Moments of the Hurwitz zeta function on the critical line.**
- 11 Nov 2022 Program on Number Theory and Physics, Simons Center for Geometry and Physics
- 02 Nov 2022 Algebra/Number Theory Seminar, University of Rochester
- 29 July 2022 PIMS CRG Workshop on Moments of  $L$ -functions, University of Northern British Columbia
- 27 May 2022 CANT 2022 (Combinatorial and Additive Number Theory)
- 02 Apr 2022 47th Annual New York State Regional Graduate Mathematics Conference, Syracuse
- 28 Mar 2022 Graduate Number Theory Seminar, Rutgers University
- 23 Mar 2022 Number Theory Seminar, Duke University
- 18 Mar 2022 Graduate Students' Seminar, University of Rochester

## Expository Talks

- 21 Apr 2021 **The Distribution of Values of  $\zeta(s)$  inside the Critical Strip.**  
London Analytic Number Theory Study Group
- 04 Dec 2020 **Discrepancy Bounds for the Riemann Zeta Function.**  
Oral Exam, University of Rochester
- 27 Feb 2020 **The Zig-Zag Product and Reingold's Theorem.**  
Combinatorics Seminar, University of Rochester
- 25 Feb 2020 **A Crash Course in Complexity Theory with a view towards  $\text{ustcon} \in L$ .**  
Combinatorics Seminar, University of Rochester

## Undergraduate Mentoring

### Guided Reading Program, AMS Grad Student Chapter, UoR.

- Sep'22– Alhussein Khalil, *Roth's theorem on arithmetic progressions.*
- Feb'22–Aug'22 Tran Duy Anh Le, *Introduction to analytic number theory.*
- Oct'20–May'21 Zhengkai Li, *Introduction to analytic number theory.*  
She is now a Math PhD student at University of Washington
- Joint Mentorship Program, AMS Grad Student Chapter & SUMS, UoR.**
- Oct'19–Jan'20 Peter Dragos.

## Research Visits

- 07-16 Nov'22 **Simons Center for Geometry and Physics (SCGP).**  
Visit funded by the SCGP Program on Number Theory and Physics.

23-27 Aug '21 **American Institute of Mathematics (AIM)**.  
Visit funded by NSF FRG on L-functions and Arithmetic Stratification (DMS-1854398).

## Conferences and Workshops Attended

04-07 Jan '23 \*Joint Mathematical Meetings, Boston (*upcoming*)  
18-20 Nov '22 BIRS Workshop:  $L$ -functions in Analytic Number Theory  
24-28 Oct '22 SCGP Workshop: Number Theory and Physics, Stony Brook  
25-29 Jul '22 \*PIMS CRG Workshop on Moments of L-functions  
21-24 Jun '22 50 Years of Number Theory and Random Matrix Theory, IAS, Princeton  
24-27 May '22 \*Combinatorial and Additive Number Theory, 2022  
02 Apr '22 \*47th Annual NYS Regional Graduate Mathematics Conference, Syracuse  
06-10 Dec '21 AIM Workshop: Spectral graph and hypergraph theory  
17-18 Apr '21 AMS Spring Central Sectional Meeting  
03-04 Oct '20 AMS Fall Eastern Sectional Meeting  
\* – contributed talk

## Research Schools Attended

Summer '22 ANTeater '22, UC Irvine  
Summer '21 UCG Summer School: Applications of Expander Graphs to Number Theory and Computer Science  
Summer '21 Hausdorff School: The Circle Method, HIM, Bonn  
Summer '21 Summer School: Polynomial Methods, HIM, Bonn  
Summer '21 †London Analytic Number Theory Study Group  
Summer '14 Summer School in Analytic Number Theory, IHÉS, France  
† – Invited talk

## Other Teaching Experience

### Teaching Assistant – Recitations & Workshops, (*at UoR*).

Spring '21 Math 165: Linear Algebra with Differential Equations.  
Fall '20 Math 141: Calculus I.  
Spring '19 Math 162: Calculus IIA.

### Teaching Assistant – Grading, (*at UoR*).

Fall '22 Math 200: Transition to Advanced Mathematics.  
Fall '21 Math 280: Introduction to Numerical Analysis.  
Spring '21 Math 233: Introduction to Cryptography.  
Spring '20 Math 437: Graduate Algebra II.  
Fall '19 Math 436: Graduate Algebra I.  
Fall '18 Math 201: Introduction to Probability.

2012-2014 **(Senior) Academic Mentor**, (*at Counselling Service, IITK*).  
Taught remedial classes for institute-core mathematics courses, and mentored some students one-on-one

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## Service

2021– **Organizer, FRG Grad Seminar**, *American Institute of Mathematics*.  
NSF FRG on L-functions and Arithmetic Stratification (DMS-1854398)

2019– **Member, Board on Academic Honesty**, *Arts, Sciences & Engineering, UoR*.

2019–2020 **Organizer, Problem Solving Seminar**, *AMS Grad Student Chapter, UoR*.

2019–2020 **Math Department Representative**, *Graduate Students' Association, AS&E*.

2014–2015 **Chairperson, Students' Senate**, *IITK*.

2012–2015 **Students' Senate Nominee, Senate Undergraduate Committee**, *IITK*.

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## Reviewing

Refereed for Int. J. Number Theory (1 paper) and reviewed for the travel grant of the Graduate Students' Association, AS&E, UoR (6 times).

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## Awards, Scholarships, Fellowships, and Grants

2023 **JMM Graduate Student Travel Grant**, *American Mathematical Society*.

2022 & 2023 **Dean's Teaching Fellowship**, *AS&E, UoR*.  
Fellowship for teaching a course as instructor-of-record during a regular semester; typically awarded to only 2-4 math grads in an academic year.

2016 **Ratan Swarup Memorial Prize**, *IITK*.  
Best all round undergraduate student graduating at the Convocation of IIT Kanpur

2016 **IIT Kanpur Excellence Award for Leadership in Students' Affairs**.

2014 **Prof. J.N. Kapur Prize**, *Department of Mathematics and Statistics, IITK*.  
Best student among 3rd year undergrads and 1st year Masters in the department

2014 **Academic Excellence Award**, *Senate Scholarships and Prizes Committee, IITK*.

2013 **Summer Research Fellowship**, *Indian Science Academies*.  
Awarded by IASc, Bangalore; INSA, Delhi; and NASI, Allahabad to do a project under the guidance of Prof. R. Balasubramanian and Prof. Sanoli Gun at the IMSc, Chennai

2011 **Kishore Vaigyanik Protsahan Yojana (KVPY) SX Fellowship**, *IISc Bangalore*.  
Awarded to 78 (out of about 100,000 applicants) undergraduate students excelling in the fields of science to encourage them to take up research careers as scientists.

2008 **NTSE Scholarship**, *National Council of Educational Research and Training*.  
Awarded to the top 1000 high school students in India on the basis of a National Talent Search Examination (NTSE).

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## Non-academic Work Experience

Sep '16– **Boston Consulting Group**, *Gurgaon, Haryana, India*.  
Sep '17 Associate

May '15– **Deutsche Bank (DB Centre)**, *Mumbai, Maharashtra, India*.  
Jul '15 Summer Analyst