Sourabhashis Das

Curriculum Vitae

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Fields of Research

- Analytic Number Theory, Explicit/Additive/Probabilistic Number Theory, Number Theory in Function Fields.

Education

2021-2025 **Doctor of Philosophy (Mathematics)**, *University of Waterloo (UW)*, Ontario, Canada, *CGPA*: 96/100.

2018 - 2021 **Master of Science (Mathematics), Thesis-Based**, *University of Lethbridge (U of L)*, Alberta, Canada, *GPA*: 4.0/4.0.

2013 - 2018 **Integrated Master of Science (Mathematics)**, *National Institute of Science Education and Research (NISER)*, Bhubaneswar, India, *CGPA*: 8.02/10.

2013 **CBSE - All India Senior School Certificate Examination**, *D.A.V. Public School*, Cuttack, India, *Percentage*: 91.

2011 **CBSE - All India Secondary School Examination**, *D.A.V. Public School*, Cuttack, India, *CGPA*: 10/10.

University Scholarships

- **International Doctoral Student Award** (2021-2025) granted by the University of Waterloo for all years of Ph.D. studies.
- **Pure Math Doctoral Thesis Completion Award (Jan-Apr 2025)** - Selected by the Department of Pure Math, University of Waterloo to receive this award (valued at $4379).
- **University of Lethbridge Graduate Research Award (ULGRA) scholarship** (2018-2020) granted by the University of Lethbridge for both years of my graduate studies (Master's degree).
- **Myrtle Ruth Bodie Mathematics Scholarship -** Selected by the Department of Mathematics, University of Lethbridge to receive this award for the academic years 2018-2019 and 2019-2020. This is awarded to only one graduate student per year ($1000).
- **Stephen Mitchell Scholarship in Mathematics -** Selected by the Department of Mathematics and Computer Science, University of Lethbridge to receive this award for the academic year 2018-2019. This is awarded to only one student per year ($1500).
- **Innovation in Science Pursuit for Inspired Research (INSPIRE) scholarship** (2013-2018) granted by Ministry of Human Resource Development (MHRD) for all 5 years of undergraduate and graduate study (₹5000 per month).

Research/Travel Awards, and other Grants

- **Women in Mathematics (WiM) Distinguished Service Award (Dec 4, 2024)** - Selected to receive the distinguished service award in recognition of my contributions to the WiM's committee and events, especially with the Directed Reading Program and the Ontario Graduate Mathematics Conference.
- **PIMS/BIRS Team Up Research Award (Jul 29 - Aug 10, 2024)** - Selected to participate in the project "PIMS/BIRS Team Up! Pathways to Inclusive Research program" (with H. Kadiri and A. Lumley) which was funded by the Pacific Institute for Mathematical Sciences (PIMS) and hosted by the Banff International Research Station (BIRS). It was a two-week research intensive program and PIMS/BIRS handled all the travel and accommodation costs.
- **PIMS-BIRS-Simons Travel Award (Jul 21 - 28, 2024)** - Selected to receive this award to work on the project "An explicit version of Chebotarev's density theorem" with H. Kadiri and N. Ng at the University of Lethbridge for a week before the start of PIMS/BIRS Team up program. The award took care of both the travel and lodging involved.

- **Research Visit (Jul 21 - 28, 2024) sponsored by NSERC** - The Natural Sciences and Engineering Research Council of Canada (NSERC) grant awarded to H. Kadiri and N. Ng covered the per-diems while working on the project "An effective version of Chebotarev's density theorem" with them at the University of Lethbridge during this period.
- **Comparative Prime Number Theory Symposium/PIMS Travel Award (Jun 17 - 21, 2024)** - Selected to receive this travel award, valued at $550, which covered travel for attending the "Comparative Prime Number Theory Symposium" at the University of British Columbia, Vancouver, Canada.
- **Canadian Number Theory Association/Fields Institute Travel Award (Jun 10 - 14, 2024)** - Selected to receive this travel award, valued at $700, which covered travel and accommodation for attending the "Canadian Number Theory Association XVI" meeting at Fields Institute, Toronto.
- **Scholar II/Fields Institute Travel Award (May 28 - 30, 2024)** - Selected to receive this travel award, valued at $400, which covered travel and accommodation for attending the "SCHOLAR II - A Scientific Celebration Highlighting Open Lines of Arithmetic Research" meeting at Fields Institute, Toronto.
- **Equity, Diversity, Inclusion, and Anti-racism (EDI-R) grant (2024):** Partnered up with the Waterloo Women in Mathematics (WiM) committee to receive a grant approval of $3500 from the Waterloo Office of EDI-R. This grant was used to organize an EDI workshop at the inaugural Ontario Graduate Mathematics Conference.
- **Summer School on Inclusive Paths in Explicit Number Theory Award (Jul 2-15, 2023)** - Selected to attend this summer school and work on the project "Explicit zero-free regions for Dedekind zeta functions" in collaboration with four other researchers. The award covered all accommodation and travel costs.
- **Research Visit (Jun 20 - July 1, 2023) sponsored by NSERC** - NSERC grant awarded to H. Kadiri and N. Ng covered the accommodation and travel costs during this period while working on the project "An explicit version of Chebotarev's density theorem" with them at the University of Lethbridge.
- **Canadian Mathematical Society Travel Award (Jun 2 - 5, 2023)** - Selected to receive this travel award, valued at $150, which covered a part of travel and accommodation costs for attending and presenting the talk titled "On the number of irreducible factors with a given multiplicity in function fields" at the Early Career Research in Number Theory session organized at 2023 CMS Summer Meeting.
- **Outstanding Teaching Assistantship Award** granted by the Department of Pure Mathematics, Waterloo for the academic year 2021-2022. The award also involved a monetary stipend of $100.
- **Mentorship Award for Directed Reading Program** hosted by Women in Mathematics (WiM) (Fall 2023) for mentoring a project titled *Arithmetic Functions and their Distributions* with two other mentees. The award also involved a monetary stipend of $400.

Publications

In Peer-Reviewed Journals:

- Generalizations of Erdős-Kac theorem with applications (with W. Kuo, and Y.-R. Liu). Conditionally Accepted, Canadian Journal of Mathematics. `https://arxiv.org/abs/2506.02432`.
- On the distribution of the total number of generators of h-free and h-full elements in an abelian monoid (with W. Kuo, and Y.-R. Liu). Accepted, Czechoslovak Mathematical Journal. `https://arxiv.org/abs/2508.12648`.
- New zero-free regions for Dedekind zeta-functions at small and large ordinates (with S. Gaba, E. S. Lee, A. Savalia, and P. J. Wong). Journal of Mathematical Analysis and Applications, Volume 556, Issue 1, Part 3, (2026) 130212. `https://doi.org/10.1016/j.jmaa.2025.130212`.
- On the distribution of the number of distinct generators of h-free and h-full elements in an abelian monoid (with W. Kuo, and Y.-R. Liu). Bordeaux Journal of Number Theory, 37 (2025), no. 3, 1041–1081. `https://arxiv.org/abs/2506.01030`.
- On limiting distributions of arithmetic functions. The Ramanujan Journal (2025) 68:45. `https://doi.org/10.1007/s11139-025-01190-8`.
- Distribution of $\omega(n)$ over h-free and h-full numbers (with W. Kuo, and Y.-R. Liu). International Journal of Number Theory (2025), World Scientific Publishing Company. `https://dx.doi.org/10.1142/S1793042125500368`.
- On the number of irreducible factors with a given multiplicity over h-free and h-full numbers (with W. Kuo, and Y.-R. Liu). Journal of Number Theory 267 (2025), 176–201. `https://doi.org/10.1016/j.jnt.2024.08.007`.

- On the number of irreducible factors with a given multiplicity in function fields (with E. Elma, W. Kuo, and Y.-R. Liu). Finite Fields Appl. 92 (2023), Paper No. 102281, 22 pp. 11N60 (11N37 11N56 11T06). https://doi.org/10.1016/j.ffa.2023.102281.

Other Publications:

- Distribution of Arithmetic Functions (with H. Pahwa and X. Xu). Notes from the Margin, Volume XVI (2024), Canadian Mathematical Society Student Committee, https://studc.math.ca/notes-from-the-margin/.
- On the distributions of prime divisor counting functions, Ph.D. Thesis (2025), University of Waterloo, https://uwspace.uwaterloo.ca/items/6918341c-46d0-43ea-8f6e-6236716211b1.
- An explicit version of Chebotarev's density theorem, Master's Thesis (2020), University of Lethbridge, https://opus.uleth.ca/items/f2d22538-ac3c-4a7a-90bb-0549c82a943e.

Preprints/Submitted Articles

- A subset generalization of Erdős-Kac theorem over number fields with applications (with W. Kuo, and Y.-R. Liu). Submitted, 33 pages. https://arxiv.org/abs/2506.03215.
- An effective version of Chebotarev's density theorem (with H. Kadiri, and N. Ng). Submitted, 56 pages. https://arxiv.org/abs/2508.09480.
- On the Selberg-Delange Method in Function Fields (with W. Kuo, Y.-R. Liu, and O. Sharpe). Submitted, 14 pages.

Currently working on...

- A handbook on generalized weighted additive functions over subsets of abelian monoids satisfying the divisibility criterion (with W. Kuo, and Y.-R. Liu).
- An effective version of Chebotarev's density theorem II (with H. Kadiri, and N. Ng).

Research Experience

Fall 2025+ **Postdoctoral Research**, University of Waterloo, Supervisors: Dr. Yu-Ru Liu and Dr. Wentang Kuo, Project 1 - *A handbook on generalized weighted additive functions over subsets of abelian monoids satisfying the divisibility criterion* and Project 2 - *On the Selberg-Delange Method in Function Fields.*

The first project investigates the distribution of analogues of prime divisor counting functions and their refinements over various subsets of countably generated abelian monoids. The second project, conducted in collaboration with Ph.D. student Owen Sharpe, develops a function-field analogue of the Selberg–Delange method to study the distribution of additive functions.

Fall 2021 - Summer 2025 **Ph.D. Thesis Research**, University of Waterloo, Supervisors: Dr. Yu-Ru Liu and Dr. Wentang Kuo, Project Title- *On the distributions of prime divisor counting functions.*

This project investigates the distribution of the prime divisor counting functions and their refinements over the natural numbers and various subsets thereof. We examine key properties such as the normal order and the Erdős–Kac theorem. The study is further extended to encompass all abelian monoids. I successfully defended my thesis and completed all degree requirements on June 14, 2025.

Summer 2024 **PIMS/BIRS Team Up! Pathways to Inclusive Research program**, Banff International Research Station, Banff, Calgary, Co-researchers: Habiba Kadiri and Allysa Lumley, Project Title- *Generalizations of the Prime Number Theorem.*

The aim of this project was to investigate Bessel-type integral functions that arise in the study of prime number theorems and its generalizations, and provide sharper explicit upper and lower bounds to these functions. We are in the process of completing a paper based on this research.

Summer 2023 & 2024 **Research Trips to Lethbridge**, University of Lethbridge, Alberta, Co-researchers: Habiba Kadiri and Nathan Ng, Project Title- *An effective version of Chebotarev's density theorem.*

With these two research trips, we moved forward towards completing the aforementioned project which is a continuation of my master's research. We have submitted an article based on this research.

Summer 2023 **Team-up project**, Banff International Research Station, University of British Columbia, Okanagan campus, Co-authors: Swati Gaba, Ethan Lee, Aditi Savalia, and Peng-Jie Wong, Project Title- *Explicit zero-free regions for Dedekind zeta functions.*

This project was carried out as part of the Summer School on Inclusive Paths in Explicit Number Theory. This project aimed to improve the zero-free regions for the Dedekind zeta functions. This involved studying earlier research on this topic and using new techniques available including the Deuring-Heilbronn phenomenon and the integral representation of the gamma function. This research has been published in the Journal of Mathematical Analysis and Applications.

Winter 2021 - Spring 2021 **Research Associate**, University of Lethbridge, Supervisors: Dr. Habiba Kadiri and Dr. Nathan Ng, Project Title- *An explicit version of Chebotarev's density theorem - II.*

This project aimed to provide explicit bounds for the error terms involved in Chebotarev's density theorem for lower range of x, i.e. range of the form $x < C$ for some constant C. My master's research studied the case $x > C$ and this new research was carried out to complete the study of providing explicit bounds for Chebotarev's density theorem in the unrestricted range of all positive real numbers. Due to our recent PIMS/BIRS Team-Up project on bounding the Bessel-type integral functions involved in the study of Chebotarev's density theorem, we have all the tools required to complete this research and submit an article based on this soon.

Fall 2018 - Fall 2020 **Research Assistant and Master's Thesis**, University of Lethbridge, Supervisors: Dr. Habiba Kadiri and Dr. Nathan Ng, Project Title- *An explicit version of Chebotarev's density theorem.*

The aim of this project was to prove a completely explicit version of Chebotarev's density theorem for the prime counting function $\psi_C(x)$ and $\pi_C(x)$. An effective version of this theorem was proved by Lagarias and Odlyzko in 1975 and an explicit version was proved by Winckler in 2018. I improved Winckler's results by studying new techniques and ideas from articles by Faber and Kadiri, Kadiri and Lumley, Fiorilli and Martin, Bennett et al., and Hasanalizade et al. and generalized them to number fields. I used explicit results concerning the zeros of Dedekind ζ-function from articles by Trudgian, Lee, Kadiri, and Ng, Hasanalizade et al., and Ahn and Kwon. The work done in this project formed part of my master's thesis which I defended on Dec 18, 2020. We are currently writing an article based on this research.

Fall 2016 - Spring 2018 **Semester Projects**, NISER, Bhubaneswar, Supervisor- Dr. Jaban Meher.

- 9th and 10th Semester Project (Final year), Project Title- *Solving Diophantine equations using elliptic curves.* This was my Master's thesis whose aim was to study elliptic curves and modular forms and understand their application in the form of modularity theorem, level lowering theorem, and Frey curves to solve Diophantine equations, such as Fermat's last theorem and equations of the form $a^p + 2^r b^p + c^p = 0$, where $p \geq 5$, $abc \neq 0$ and a, b, c are pairwise co-prime except when $r = 1$ and $(a, b, c) = \pm(-1, 1, -1)$.
- 8th Semester Project, Project Title- *Congruent Numbers and Elliptic Curves.* Aim - Studying books like *Introduction to Elliptic Curves and Modular Forms (Chapters 1 and 3)* by N Koblitz and papers like *Congruent numbers and Elliptic curves* by J Brown and *The congruent number problem* by V Chandrasekhar.
- 7th Semester Project, Project Title- *Rational Points on Elliptic Curves.* Aim - To learn properties of rational points on an elliptic curve by studying *Rational Points on Elliptic Curves (Chapters 1,2 and 4)* by Joseph H. Silverman and John Tate.

Summer 2014 - Summer 2017 **Summer Internships**, All projects funded by the Innovation in Science Pursuit for Inspired Research (INSPIRE) scholarship granted by the Ministry of Human Resource Development (MHRD).

- Summer 2017, IISER, Bhopal, Supervisor- Dr. Karam Deo Shankhadhar, Project Title- *An introduction to p-adic Numbers.* Aim - Analyzing properties of p-adic numbers by studying the book *p-adic Numbers* by F Gouvea and papers like *Equivalence of absolute values* by K Conrad and *The p-adics, Hensel's lemma, and Newton polygons* by J Marohnic.
- Summer 2016, IIIT, Hyderabad, Supervisor- Dr. Prasad Krishnan, Project Title- *Index Coding with Side information using Matroid theory.* Aim - To use information and matroid theory to understand Index Coding (IC) problems with near-extreme rates and its dual. An attempt was made to convert graph theoretic results to matroid theoretic results.
- Summer 2015, NISER, Bhubaneswar, Supervisor- Dr. Shyamal Krishna De, Project Title- *Measure Theoretic Approach in Probability.* Aim - To study monotone classes, σ-algebras, random variables, expectation, and convergence of random variables from the first chapter and ten sections from the second chapter of *Probability: A Graduate Course* by Allan Gut.
- Summer 2014, NISER, Bhubaneswar, Supervisor- Dr. Brundaban Sahu, Project Title- *Fields, Bases and Dimensions.* Aim - To study vector spaces from the first two chapters of *Finite Dimensional Vector Spaces* by Paul R. Halmos.

Employment

- **Postdoctoral Scholar**, Department of Pure Mathematics, University of Waterloo, Sept-Dec 2025. Worked as a postdoctoral researcher under the mentorship of Prof. Yu-Ru Liu and Prof. Wentang Kuo. Responsibilities included conducting research in probabilistic and additive number theory, mentoring and collaborating with Ph.D. students within the group, and authoring research papers based on this work.
- **Instructor**, Faculty of Mathematics, University of Waterloo, Jan 2023 - April 2023. Worked as the instructor for one section of the course "Calculus 2 for Honour Mathematics" (MATH 138). Responsibilities included teaching the class 3 hours a week, holding office hours every week, preparing quizzes, mid-term and end-term questions, proctoring mid-terms and end-terms exams, and grading the exams.
- **Research Associate**, Department of Mathematics and Computer Science, University of Lethbridge, Jan 2021 - Aug 2021. Worked on a follow-up project based on my Master's research and prepared an article based on this.

- **Teaching Assistant**, Department of Pure Mathematics, University of Waterloo. The responsibilities included marking weekly/bi-weekly assignments and final exams, proofreading Möbius quizzes, proctoring exams, holding weekly office hours, answering questions on Piazza, teaching tutorials, leading TA teams, and distributing the marking among all the TAs. The following is a list of courses I was a teaching assistant for:
  - **Summer 2025:** PMATH 352 (Complex Analysis) and MATH 640-Online (Number Theory for Teachers).
  - **Fall 2024:** PMATH 336 (Introduction to Group Theory with Applications) and MATH 647-Online (Foundations of Calculus 1 for Teachers).
  - **Spring 2024:** MATH 636-Online (Linear Algebra for Teachers) and MATH 640-Online (Number Theory for Teachers).
  - **Winter 2024:** AMATH/PMATH 332 (Applied Complex Analysis) and as a Tutor for the Teaching Centre.
  - **Fall 2023:** PMATH 440/740 (Analytic Number Theory), PMATH 340 (Elementary Number Theory) and MATH 135 (Algebra for Honours Mathematics).
  - **Spring 2023:** MATH 237-Online (Calculus 3 for Honours Mathematics) and MATH 640-Online (Number theory for teachers).
  - **Fall 2022:** PMATH 347 (Groups and Rings) and MATH 147 (Advanced Calculus 1).
  - **Spring 2022:** MATH 119 (Calculus 2 for Engineering) and MATH 640-Online (Number theory for teachers). I received the Outstanding Teaching Assistant award for 2021-22 based on the recommendation of the instructor for MATH 119.
  - **Winter 2022:** MATH 135 (Algebra for Honours Mathematics) and PMATH 332 (Applied Complex Analysis).
  - **Fall 2021:** MATH 117 (Calculus 1 for Engineering) and MATH 137 (Calculus 1 for Honours Mathematics).
- **Teaching Assistant**, Department of Mathematics and Computer Science, University of Lethbridge. The responsibilities included marking weekly/bi-weekly assignments and final exams, proctoring exams, and teaching tutorials. The following is a list of courses I was a teaching assistant for:
  - **Fall 2020:** Mathematical Proofs and Concepts, Calculus-I, Analysis-II and Calculus-III.
  - **Spring 2020:** Mathematical Proofs and Concepts, and Calculus-IV.
  - **Fall 2019:** Introduction to Calculus course and marked for Calculus-II.
  - **Spring 2019:** Elementary Linear Algebra and Mathematical Concepts.
  - **Fall 2018:** Elementary Linear Algebra course.
- **Tutor**
  - **Fall 2019 - Fall 2020:** Worked as a tutor for mathematics and statistics help sessions organized by the Student Success Centre and the Department of Mathematics and Computer Science, University of Lethbridge which runs throughout the semester and is aimed at providing help to students in different math and statistics courses.
  - **Fall 2019 - Fall 2020:** Worked as a tutor for the Accommodated Learning Centre, University of Lethbridge.
  - **Fall 2018 - Fall 2023:** Working as a private tutor in mathematics.

Academic Administrative Experience and Volunteer Work

- **Journal Reviewer (2025+):** Working as a reviewer for The Canadian Mathematical Bulletin journal.
- **Graduate Student Association (GSA) council representative** (Jun 2022 - Jun 2024). Served as the GSA council representative for the Department of Pure Mathematics. Responsibilities include discussing various policy changes at the university in order to serve the needs of graduate students, discussing various steps to improve graduate life at Waterloo, and bringing any departmental concerns in front of the whole GSA.
- **Graduate student representative**, Department of Mathematics and Computer Science, University of Lethbridge, 2019-2020. Represented the community of math graduate students at department meetings.

- **Organizer/Co-organizer**
  - **Student Number Theory Seminar (2022-2025):** Co-organized the student number theory seminar hosted in the Department of Pure Mathematics at Waterloo. Responsibilities included arranging speakers for the seminars, publicizing the weekly seminars around the departments, and handling the interaction with the audience during the seminars.
  - **Ontario Graduate Mathematics Conference (OGMC) (Jun 7-9, 2024):** Organized the inaugural OGMC at the University of Waterloo. Served as the chair of the local committee and handled all the logistics responsibilities associated with the conference.
  - **Learning seminar on Function Fields (Spring 2023):** Co-organized the learning seminar on function fields. Responsibilities included deciding the content to discuss each week, arranging speakers for every week, publicizing the talks, and giving several talks in this series.
  - **Learning seminar on Sieve Methods (Fall 2023):** Co-organized the learning seminar on sieve methods. Responsibilities were the same as in the previous learning seminar on function fields.
- **Volunteer**
  - **Spring 2025:** Volunteered to be one of the panelists at Canadian Undergraduate Mathematics Conference Academic Careers Panel event, organized at Waterloo.
  - **Winter 2025:** Volunteered to be the moderator for the student life panel at the grad student visit event organized by the Faculty of Mathematics, Waterloo.
  - **Fall 2023 - Fall 2024:** Volunteered as a graduate student panelist for the Faculty of Mathematics, Waterloo on various occasions, including the Graduate Student Orientations (Summer 2024) and Teaching Assistant Orientations (Fall 2024).
  - **Fall 2023:** Volunteered for the GSA to help with the Graduate Student Orientation. Responsibilities included representing the Department of Pure Mathematics at the orientation and answering any questions put forward by the new graduate students about their programs.
  - **Fall 2022 - Spring 2024:** Volunteered to be a peer mentor for the Department of Pure Mathematics at the University of Waterloo. Responsibilities included informing the incoming grad students about various resources at the university and helping them ease into their graduate programs.
  - **Spring 2021:** Volunteered to be a facilitator for the event "Summer School on Inclusive Paths Toward Number Theory (Online)" organized by the Pacific Institute for the Mathematical Sciences (PIMS) from Aug 23-27, 2021. Responsibilities included being a group leader, paying equal attention to each member of my group, and seeing to it that all the voices in my group are heard and respected.
  - **Fall 2020:** Volunteered for the Alberta highway clean up program organized on Sep 21 and my Chinook Cricket Club cleaned 46km of the assigned highway.
  - **Summer 2020:** Volunteered at the Lethbridge Soup Kitchen to serve dinner to their homeless guests on Jul 2.
  - **Fall 2019:** Volunteered to represent the department of mathematics at the Fall open house which aimed at encouraging prospective undergrads to pursue a mathematics degree.
  - **Spring 2019 - Spring 2020:** Volunteered for the math fair organized at the University of Lethbridge to promote mathematics among the students from K-12.
  - **Fall 2018 - Spring 2020:** Volunteered to host regular tea-time at the Department of Mathematics and Computer Science, U of L. Organized Pi-day events and regular board games night in the department.

Talks

Conference	Talk titled- "On the distributions of prime divisor counting functions: From Hardy-Ramanujan to Erdős-Kac" selected for 33èmes Journées Arithmétiques conference at the University of Luxembourg (Jun 30-Jul 4, 2025).
Conference	Talk titled- "On the distributions of prime divisor counting functions: From Hardy-Ramanujan to Erdős-Kac" at the Ontario Graduate Mathematics Conference, Toronto (Jun 1, 2025).
Seminar	Talk titled- "On the distributions of prime divisor counting functions: From Hardy-Ramanujan to Erdős-Kac" in the Number Theory Seminar at Waterloo (Mar 25, 2025).
Seminar	Talk titled- "Love, Life, and the Math Behind It: Solving the Ultimate Equation" in the PMATH Graduate Student Colloquium at Waterloo (Feb 14, 2025).
Seminar	Talk titled- "Tools in analytic number theory" in the Student Number Theory seminar at Waterloo (Jan 15, 2025).

Conference	Talk titled- "New explicit zero-free regions for the Dedekind-zeta functions throughout the critical strip" at the inaugural Ontario Graduate Mathematics Conference (Jun 7-9, 2024).
Seminar	Talk titled- "Chapter 7 - Selberg's Sieve" in the Learning Seminar on Sieve Methods at Waterloo (Oct 3-17, 2023).
Seminar	Talk titled- "Chapter 5 - Algebraic Function Fields and Global Function Fields" in the Learning Seminar on Function Fields at Waterloo (Jun 6-20, 2023).
Conference	Talk titled- "On the number of irreducible factors with a given multiplicity in function fields" at the Early Career Research in Number Theory session organized at 2023 CMS Summer Meeting by the Canadian Mathematical Society (Jun 3, 2023).
Seminar	Talk titled- "On the number of irreducible factors with a given multiplicity in function fields" in the Student Number Theory seminar at Waterloo (May 30, 2023).
Course presentation	Talk titled- "The Davenport-Heilbronn method" in the Waterloo PMATH 940 course presentations (Mar 28, 2023).
Seminar	Talk titled- "An explicit version of Chebotarev's density theorem" in the Student Number Theory seminar at Waterloo (Mar 14, 2023).
Seminar	Talk titled- "Chapter 2 - Algebraic curves" in the Learning Seminar on Elliptic Curves at Waterloo (Jan 19, 2023).
Course presentation	Talk titled- "The number of steps in the Euclidean algorithm" in the Waterloo PMATH 940 course presentations (Dec 1, 2022).
Seminar	Talk titled- "On the Omega function" in the Student Number Theory seminar at Waterloo (Oct 4, 2022)
Seminar	Talk titled- "More on Waring's problem" in the Student Number Theory seminar at Waterloo (Jun 21, 2022).
Seminar	Talk titled- "Into the world of polynomial rings" in the Student Number Theory seminar at Waterloo (May 10, 2022).
Course presentation	Talk titled- "Non-vanishing of Ramanujan's τ-function" as a part of the Waterloo PMATH 940 course presentations (Dec 2, 2021).
Conference	Talk titled- "An explicit version of Chebotarev's Density Theorem" at the Student Research Talks session organized at 2020 CMS Winter Meeting (Online) by the Canadian Mathematical Society (Dec 6, 2020).
Conference	Talk titled- "An explicit version of Chebotarev's Density Theorem" at Alberta Number Theory Days XII (Online) organized by Banff International Research Station (May 2, 2020).
Seminar	Gave a talk titled- "Group law of elliptic curves" at the student seminar organized by the Department of mathematics and computer science, U of Lethbridge (Jan 17, 2020).
Course presentation	Gave talks titled- "Endomorphisms of complex tori" and "Supersingular elliptic curves" at the graduate talks organized as a part of the course Mathematics of Public Key Cryptography, U of L (Fall 2019).
Course presentation	Gave talks at the end of each semester to present my work during that semester (4th year and 5th year, NISER).
Course presentation	Gave a talk titled- "Topological groups" at the undergrad research presentation (3rd year, NISER).
Conference	Gave a talk titled- "Pythagorean triple and its relation to a certain equation" at Training Program in Mathematics, NISER, Bhubaneswar (Jun, 2015).
Course presentation	Gave a talk titled- "Solving Fermat's Last Theorem for the case n=4" at the undergrad research presentation (2nd year, NISER).

Conferences/Schools/Workshops/Symposium/Research in Teams attended

Conference	Ontario Graduate Mathematics Conference (OGMC), University of Toronto, May 30-Jun 1, 2025.
Research in Teams	PIMS/BIRS Team Up! Pathways to inclusive research, Banff, Jul 29 - Aug 10, 2024. Project topic - Generalizations of the Prime Number Theorem (with H. Kadiri and A. Lumley).
Research in Teams	Research Trip to Lethbridge (Jul 21 - 28, 2024). Project topic "An effective version of Chebotarev's density theorem" (with H. Kadiri and N. Ng).
Symposium	Comparative Prime Number Theory Symposium, University of British Columbia, Vancouver, Jun 17-21, 2024.
Conference	Canadian Number Theory Association XVI (CNTA XVI), The Fields Institute / University of Toronto, Jun 10-14, 2024.
Conference	Ontario Graduate Mathematics Conference (OGMC), University of Waterloo, Jun 7-9, 2024.

Conference	SCHOLAR II - A Scientific Celebration Highlighting Open Lines of Arithmetic Research, The Fields Institute / University of Toronto, May 28-30, 2024.
Conference	Midwest Arithmetic Geometry and Number Theory Conference, University of Michigan, Oct 7-8, 2023.
School & Research in Teams	Summer School on Inclusive Paths in Explicit Number Theory, Pacific Institute for the Mathematical Sciences, Jul 2-15, 2023. The aim of the school included learning the latest methods and techniques in explicit number theory and promoting equity, diversity, and integrity in the mathematics community. In the second week of the school, I worked on the project "Explicit zero-free regions for Dedekind zeta functions" in collaboration with four other researchers.
Research in Teams	Research Trip to Lethbridge (Jun 20 - Jul 1, 2023). Project topic "An explicit version of Chebotarev's density theorem" (with H. Kadiri and N. Ng).
Conference	2023 CMS Summer Meeting, Canadian Mathematical Society, Jun 2-5, 2023.
Conference	2022 CMS Winter Meeting, Canadian Mathematical Society, Dec 2-5, 2022.
Workshop	L-functions in Analytic Number Theory (Online), Pacific Institute for the Mathematical Sciences, Banff International Research Station, Nov 18-20, 2022.
School	Summer School on Inclusive Paths Toward Number Theory (Online), Pacific Institute for the Mathematical Sciences, Aug 23-27, 2021. Aim of the school included promoting equity, diversity and integrity in the mathematics community.
Conference	Around Frobenius Distributions And Related Topics II (Online), Jun 28 - Jun 29, 2021.
Conference	2021 CMS Summer Meeting (Online), Canadian Mathematical Society, Jun 7 - Jun 11, 2021.
Conference	2020 CMS Winter Meeting (Online), Canadian Mathematical Society, Dec 3 - Dec 8, 2020.
Conference	Alberta Number Theory Days XII (ANTD XII - Online), Banff International Research Station, May 1 - May 3, 2020.
Conference	Alberta Number Theory Days XI (ANTD XI), Banff International Research Station, May 10 - May 12, 2019.
Workshop	Training Program in Mathematics (Level-2), Center for Fundamental Studies, NISER, Bhubaneswar, May 25- June 20, 2015. Aim of the school was to promote mathematics as a career and introduce various fields in mathematics including complex analysis and topology.

Relevant Coursework

Mathematics

- **Graduate courses, Waterloo:** Modular Forms in one variable, Diophantine Approximations, Circle Methods, Local Fields, Analytic Number Theory II (UBC/PIMS - audited online), and Moments of L-functions (UNBC/PIMS - audited online).
- **Graduate courses, Lethbridge:** General Abstract Algebra, Real Analysis, Multiplicative Number Theory, Mathematics of Public Key Cryptography, and Algebraic Number Theory (UNBC - audited online).
- **Graduate courses, 4th and 5th years, NISER:** Finite Fields, Commutative Algebra, Algebraic Geometry, Advance Linear Algebra, Modular Forms in One Variable, Advance Probability, Theory Of Computation, Algebraic Topology, Introduction to Stochastic Processes, Representation of Finite Groups, Functional Analysis, and Cryptology.
- **Undergraduate courses, 2nd and 3rd years, NISER:** Measure Theory, Complex Analysis, Topology, Differential Equations, Geometry of Curves and Surfaces, Optimization Theory, Field and Galois Theory, Calculus of Several Variables, Rings and Modules, Statistics, Real Analysis, Metric Spaces, Group Theory, Linear Algebra, Elementary Number Theory, Probability Theory, and Discrete Mathematics.

Others

- **Sciences :** Classical Mechanics, Quantum Mechanics in Physical Sciences, Ecology in Biological Sciences, Inorganic Chemistry in Chemical Sciences.
- **Humanities and Social Sciences :** Introduction to Sociology, Technical Communication, Introduction to Economics, Sociology of Science and Technology, Life and Community in Urban World, Banking Money and Financial Market, Introduction to Innovation System.

Computer skills

Programming Languages	C++, Python, Shell Programming, R Programming, Maple, PARI/GP
Markup Languages	LaTeX

Operating Systems: Linux (Ubuntu, Fedora), Windows (XP, 7, 8, 8.1, 10, 11)

Academic references

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