

Ishaan Bhadoo

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EDUCATION

Trinity College, University of Cambridge

Ph.D. in Mathematics in the Department of Pure Mathematics and Mathematical Statistics

Cambridge, UK

Oct. 2025 -

Advisor: Prof. Wendelin Werner. Funding: [Gates Cambridge Scholarship](#)

Trinity College, University of Cambridge

Master of Advanced Study (Part III) in Mathematics

Cambridge, UK

Oct. 2024 – July 2025

Thesis: Random Walk on Dynamical Percolation - 93%, $\alpha+$ (highest grade). Advisor: Prof. Perla Sousi

Indian Statistical Institute

Bachelor of Mathematics (Honors). Grade: First division with distinction

Bangalore, India

Aug. 2021 – June 2024

RESEARCH PROJECTS

Rewiring Markov chain on Brownian loop-soups (Joint with Wendelin Werner)

In preparation

University of Cambridge

Cambridge, UK

- Developed a theory of a natural Markov chain on Brownian loop-soups (related to the notion of indistinguishability of bosons). Connections to the Gaussian free field.

Percolation of Words (Joint with Ritvik Radhakrishnan)

May 2024– Dec 2024

ETH Zurich

Zurich, Switzerland

- Research project, studying the problem of percolation of words. The project's goal is to show that there are no exceptional words in site percolation on a transitive non-amenable graph.
- Generalising a theorem of Kesten-Benjamini for periodic trees we proved that all words are seen in a locally finite tree. Our proof can be found [here](#).
- Resolved the question for all graphs with isoperimetric dimension greater than 2 and for all trees. The PDF can be found [here](#).

Random Walk on Dynamical Percolation

Dec 2024 – May 2025

University of Cambridge

Cambridge, UK

- Part III thesis under the direction of Prof. Perla Sousi. [Comments by Prof. Sousi](#) on my essay can be found here.
- Developed simulations in Python to analyze cover times of random walks on evolving networks.
- Proved new bounds comparing the cover times for random walk on dynamical percolation and the cover time of the simple random walk on certain class of graphs
- Eventually completed the project by resolving Question 1.12, a question posed in [The Annals of Probability](#). The PDF can be found here.

Critical threshold for regular graphs

May 2024 – July 2024

Tata Institute of Fundamental Research

Bombay, India

- Research work under the direction of Prof. Subhajit Goswami (Undergraduate Work)
- Showed that for d -regular quasi-transitive graphs G , $p_c(G) = \frac{1}{d-1}$ holds only for trees. Gave counterexamples for the non-quasi-transitive case.
- Gave a talk at TIFR, the slides for my presentation can be found here [\[slides\]](#). Article describing my work: <https://arxiv.org/abs/2412.00635>

ACADEMIC ACHIEVEMENTS

- Gates-Cambridge Scholarship** – Awarded to 65 people out of c.8000 applicants. Full funding to do a PhD.
- Trinity College Studentship** – Funding covering tuition, living expenses, and an additional research stipend.
- Oxford-Cambridge Society of India Scholarship** – Award of £2000 and membership of the [OCSI](#). Details about the society can be found [here](#).
- Visiting Students' Research Program** – Selected for VSRP-2024 for summer research at TIFR, Mumbai. 19 students selected for mathematics nationwide.

- **S. N. Bhatt Memorial Excellence Fellowship** – Received the SN Bhatt Memorial fellowship for summer research at ICTS. 20 students were selected for the fellowship, 6 in mathematics. Awarded 30,000 INR stipend along with travel and living expenses.
- **All India Rank 10, Madhava Mathematics Competition** – Selected for the MMC camp with an All India Rank of 10.
- **Indian Statistical Institute Studentship, ISI, Bangalore** – All India Rank 26 in the ISI entrance exam. Full financial support with no tuition fees, a stipend, and a contingency grant for the B.Math program.
- **Mathematical Olympiad Awardee, India 2019** – Cleared regional math olympiads and selected for the nationals, being among the top 30 students.
- **Other awards (not availed):**
Harding Scholarship, University of Cambridge Awarded to 35 people out of c.5000 people. Full funding to do a PhD.
McFarlan Fellowship, University of Washington Fellowship of 5000 USD (for the first two years), to pursue a Ph.D. in mathematics at UW. Not availed due to the offer from Cambridge.
Department Award, Department of Statistics, University of California, Berkeley Additional stipend of c.20000 USD for the first 4 years of PhD at Berkeley. Not availed due to the offer from Cambridge.
Dean Fellowship - University of Maryland, College Park Received the Dean Fellowship of 5000 USD (for the first two years), to pursue a Ph.D. in mathematics at UMD. Not availed due to the offer from Cambridge.
International Tuition Award, Departmental Award - University of British Columbia, Canada International tuition award of 3200 CAD per year, and the departmental award from the department of mathematics of 1500 CAD to pursue MSc in Mathematics at UBC. Not availed due to the offer from Cambridge.

TECHNICAL SKILLS

- **Python** (proficient), **LaTeX** (proficient), basic experience with **Java**, **C++**. Mathematical tools such as: **Lean**, **NumPy**, and **Matplotlib**. Familiar with **Git**, **Jupyter Notebooks**

TALKS AND PRESENTATIONS

Part III Student Seminar, University of Cambridge	December 2024
• <i>Title: No exceptional words for percolation on trees</i> [pdf]	
Visiting Students' Research Program, TIFR Mumbai	June 2024
• <i>Title: Strict monotonicity of the critical threshold</i> [slides]	
Mathematics Club, ISI Bangalore	September 2023
• <i>Title: Percolation at criticality for graphs with exponential growth</i> [slides, part I]	
S.N. Bhatt Memorial Fellowship Program, ICTS Bangalore	July 2023
• <i>Title: Percolation on Hyperbolic Graphs</i> [slides]	
ISI-SNU Student Talk Series, Shiv Nadar University	October 2023
• <i>Title: Conformal Invariance in 2D Percolation</i> [slides]	

TEACHING EXPERIENCE

University of Cambridge - Supervisor

- Supervision of the Part II course on Probability and measure (Michaelmas 2025 and Michaelmas 2026)

Indian Statistical Institute, Bangalore - Undergraduate Directed Group Reading Program

Mentored B.Math 1st and 2nd years during winter 2022 and summer 2023 in the following topics:

- Field and Galois Theory (Nov-Jan, 2022).
- Martingale Theory (May-July 2023, Joint with Sarvesh Iyer (Ph.D. student at ISI)).