

# Bharath Roy Choudhury

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## WORK EXPERIENCE

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- Max Planck Dioscuri center for Random walks in Geometry and Topology,**  
**Jagiellonian University, Kraków** | *Postdoc* Oct 2024 - present
- INRIA, Paris, France** | *Starting research position* Dec 2023 - Sep 2024
- École normale supérieure – PSL, Paris, France** | *Doctor of Philosophy (PhD) in Mathematics* Sep 2019 - Nov 2023
- Thesis: [Records of stationary processes and unimodular networks](#)
- Description: My PhD thesis focuses on unimodular networks derived from stationary processes, particularly examining the distribution of the networks derived in the case of i.i.d. increments of skip-free to the left random walks. It also studies the conditions for representing a unimodular directed tree through the records of a stationary sequence. Additionally, the thesis presents results on the asymptotics of any dynamics on unimodular networks under certain conditions.
- Advisor: Prof. François BACCELLI, Co-advisor: Prof. Bartłomiej (Bartek) BŁASZCZYŚZYN
- INRIA, Paris, France** | *Research Engineer* Mar 2019 - Aug 2019
- Basque Center for Applied Mathematics (BCAM), Bilbao, Spain** | *Intern* Sep 2018 - Nov 2018
- Research topic: Projective geometry of convex sets and its applications to machine learning
- Harish-Chandra Research Institute, Allahabad, India** | *Intern* Jun 2011 - Jul 2011
- Summer Programme in Mathematics (SPIM)

## INDUSTRY EXPERIENCE

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- LINCS, Palaiseau, France** | *Member (research)* Mar 2019 - Sep 2024
- [Lincs](#) is a joint academy-industry research and innovation Lab, active in the domain of future information and communication networks, systems and services. I had many interactions with the members of industry partners such as Nokia Bell Labs and SystemX.
- PSL-iTeams** | *Member* Sep 2021 - Mar 2022
- Worked in Entrepreneurship and Innovation lab where I provided consultation services to a startup focused on medical imaging.
- Infotech Enterprises Limited (rebranded as Cyient), Hyderabad, India** | *Software Engineer* Jun 2007 - Jun 2009
- Contributed towards process automation tools for Hamilton Sundstrand and a refrigerator manufacturing company.

## PROFESSIONAL DEVELOPMENT

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- NEMO reading group** | *Organiser* Mar 2019 - Sep 2023
- [Nemo reading group](#), held every Thursday at INRIA Paris and at Télécom Paris, serves as a platform for invited speakers to share insights and discuss compelling research papers in the realms of unimodular graphs, stochastic geometry, and stochastic processes.
- Glucoband project** | *Team leader* May 2010 - Apr 2011
- [Glucoband project](#) aims to develop an automatic glucose detector and insulin injector. It is funded by the Promotion of Work Experience and Research ([PoWER](#)) organisation of IIT Kanpur, India.

## EDUCATION

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- Indian Statistical Institute (ISI), Kolkata, India** Jul 2016 - Jun 2018
- MASTER OF MATHEMATICS (M. MATH.)
- Research project title: *Group action on the Furstenberg-Poisson boundary of lamplighter groups*
- Description: This two-year degree is focussed on pure mathematics courses with a research project in the second year.
- Indian Institute of Science (IISc), Bangalore, India** Jul 2012 - Jul 2016
- MASTER OF SCIENCE (M.S.) IN INTERDISCIPLINARY MATHEMATICS
- Thesis: *Asymptotic lower bound for quasi-transitive codes over cubic finite fields*
- Description: This three-year research degree is focused on interdisciplinary research between engineering and mathematics. The degree comprises a year of coursework followed by two years of research, culminating in the submission of my master's

thesis in December 2015, with a successful defense in July 2016. In the field of algebraic function fields and codes, my thesis addresses a complex issue in coding theory — the development of a sequence of cyclic codes that are asymptotically good. I provided a construction of a sequence of quasi-transitive codes, a subset of which includes cyclic codes that are asymptotically good. This construction utilizes function fields over cubic finite fields.

**Indian Institute of Technology Kanpur (IITK), Kanpur, India**

Jul 2009 - May 2011

MASTER OF TECHNOLOGY (M. TECH.) IN MATERIALS SCIENCE

Thesis: *Fluorescent White Organic Light Emitting Diodes (FWOLEDs): characterization and simulation*

Description: This two-year degree is focused on studying electronic materials and composed of one year of coursework followed by one year of research work. Area of research: Organic electronics. The core of my thesis revolves around the meticulous processes of design, simulation, and experimental studies pertinent to FWOLEDs.

**Jawaharlal Nehru Technological University (JNTU), Hyderabad, India**

Aug 2003 - Apr 2007

BACHELOR OF TECHNOLOGY (B. TECH.)

Description: This is a four-year degree focused on electronics and communication engineering courses that include wireless and satellite communications, signal processing, electrical networks, electronic devices, etc.

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**PROGRAMMING LANGUAGES**

Python, Julia and C++.

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**SPOKEN LANGUAGES**

English: Fluent, French: Beginner, Telugu: Fluent, Hindi: Good, Bengali: Fluent.

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**PREPRINTS**

- (Submitted) *Genealogies of records of stochastic processes with stationary increments as unimodular trees*, with [François Baccelli](#) ; arXiv Link: <https://arxiv.org/abs/2403.05657>
- (In preparation) *Vertex-shift probabilities* with [François Baccelli](#) .
- PhD Thesis: *Records of stationary processes and unimodular graphs*, arXiv: <https://arxiv.org/abs/2312.08121>

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**ONGOING WORKS**

- *Stability of scattering transform on sparse graphs*, with [Simon Coste](#) and [Bartłomiej \(Bartek\) Błaszczyszyn](#).
- *Gradient descent algorithm on stationary random fields*, with [François Baccelli](#).
- *Coupling of Poisson hyperplane tessellations*, with [Eliza O'Reilly](#).

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**TALKS AND PRESENTATIONS**

- Contributed talk at Bernoulli-ims 11th World Congress in Probability and Statistics, Bochum, Germany, August 12-16, 2024.
- Invited talk at Biomathematics and Theoretical Bioinformatics group, Bielefeld university, 23 May 2014.
- Invited talk at the probability seminar of the Institute de Mathématiques of Aix-Marseille University, 09 April 2024, Marseille.
- Poster presentation at Eurandom YEP 2024: Interplay between local and global graph structures, Eindhoven, 11 Mar 2024 - 15 Mar 2024.
- Poster presentation at 43rd conference on Stochastic Processes and their Applications (SPA2023), Lisbon, 24 July 2023 - 28 July 2023.
- Contributed talk at STAR Workshop on Random Graphs 2022, Groningen, 02 November 2022 - 04 November 2022.
- Contributed talk at Lille Days in Point Processes and Stochastic Geometry, Lille, 17 October 2022 - 21 October 2022.
- Contributed talk at Summer School: Mathematics of Large Networks, Budapest, 30 May 2022 - 06 June 2022.

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**HONORS AND AWARDS**

- Awarded the best consultation team award for the year 2021 - 2022 at PSL-iTeams.

- Received a monthly stipend and yearly contingency grant from the Indian Statistical Institute throughout the M.Math course (July 2016 to June 2018).
- Granted a monthly stipend by the Indian Institute of Science during the M.S. course (July 2012 to April 2015).
- Achieved the CSIR Junior Research Fellowship in Mathematical Sciences (All India Rank: 91, General Category) based on a nationwide test conducted on 23/12/2012 (Fellowship not availed).
- Earned the UGC Junior Research Fellowship in Mathematical Sciences following a nationwide test on 17/06/2012 (Fellowship not availed).
- Awarded the Post Graduate Scholarship through GATE (2009) for M.Tech. in Materials Science at IIT Kanpur, securing rank 294 (General Category) in Electronics and Communication Engineering (ECE) in GATE (2009).
- Recognized as part of an outstanding team (five members) for significant contributions to Process Automation Tools for Hamilton Sundstrand, earning the "Outstanding Team" award at Infotech Enterprises Limited (now Cyient), Hyderabad, India, in December 2007.