

Introduction:

As an avid explorer of the intricate landscapes of mathematics, I, Atrajit Sarkar, embark on this journey to articulate my academic aspirations and fervent passion for the discipline. Currently pursuing my Master of Science in Mathematics from IIT Delhi and amidst the intellectually stimulating realm of my fourth semester, I find myself engrossed in a plethora of mathematical domains, with a particular penchant for topology, number theory, algebraic topology, algebra, and analysis.

Purpose for taking the Course:

How I came to know:

I came to know about string theory in my 11th and I felt interest in towards that topic from youtube videos mainly, then I came to know that knot theory is being used in string theory, hence I got fascinated and then I went to Bsc and took topology as DSE, and then I got topology in core course in Msc in IIT Delhi. And I came to know about Algebraic topology that it has a wide use in knot theory and took that course as elective in IIT Delhi. Now, interest grew in myself and I read the basics of knot theory from "**The Knot Book**", by *Colin.C.Adams*.

Why to take:

The purpose of joining the Phd programme is to know more about the topic that I dreamt to pursue as my future career. I planned to do **Knot Theory** and then **String Theory** as I want to know the reality of the world and I feel that **String Theory** better explains that. Towards this direction I made my higher educational academic Journey.

Academic Journey:

As per my interest in Analysis, **Knot theory** (*main interest*), Algebra, **Number theory**, I read **Number theory** from *David M. Burton's* Book quite a bit in 11-12th by my own. And

read **Topology** in Bsc elective and Msc core course. Then after coming to IIT Delhi for msc I took **Algebraic Topology** as elective so that I can dive more into **Knot Theory**.

Courses Done by Me:

1.Projects: I have done one project in algebraic topology in summer from IITD and two core course projects on **Morse Theory** and **Complexity of 3-Manifold**.

I did a summer project on basic **Algebraic topology** from IIT Delhi under the supervision of **Dr. Biplab Basak**.

2.Core Courses: I have read *Functional Analysis, Measure Theory, Harmonic Analysis, PDE, ODE, basic Real Analysis* as *Analysis part*.

I did basic point set topology, algebraic topology, algebra for going into **Knot Theory**.

3. Self Study: I read **Number Theory** from *David M. Burton* in 11-12th as a beginning to introduction to Number Theory.

Reasons for joining the institute:

Mainly for Mam Dr. Rama Misra. I came to know that she is now the leading mathematician in Knot Theory in India. Her countless contributions towards the topic motivated me. I also attended her seminar held in my institute IIT Delhi. My project supervisor Dr. Biplab Basak also recommended me to go for a Phd under Dr. Rama Misra. And I feel she is the best professor who can guide me towards Knot Theory and fully fill my dream of going into String Theory. So, I feel IISER Pune is the best Institute for me.

Career Goals:

- **Step 1:** Firstly, I want to complete my journey in knot theory.
- **Step 2:** Secondly, I want to pursue String theory to know the unknown of the Universe.
- **Step 3:** Thirdly, I want to contribute towards solving the problem of building connection between **Quantum Mechanics** and **General Theory of Relativity**.

References:

1. [Morse Theory](#) project: [Here is My report card](#).
2. [Complexity Of 3-manifold](#): [Here is my report Card](#)