STATEMENT OF PURPOSE
Suman Ghosh
JOINT DOCTORAL DEGREE PROGRAM(JDP)

Respected Readers,

My inclination towards fundamental research in Mathematics and Computer Science started a long time ago. When I was in 12th standard, I noticed how the world started revolving around computers and technologies. I was curious about learning such technologies. Then during my masters I came to know about Cryptography for the first time. After reading some articles about Cryptography and its real life applications, I really found this field of study to be more interesting and fascinating. And this field of study belongs to an intersection of Mathematics and Computer Science also. Driven by curiosity and passion, I ended up pursuing M.Tech thesis project in Cryptography. In the future, I wanted to pursue a PhD in Cryptography to explore more unexplored areas and unanswered questions in this field

I started my undergraduate studies in Mathematics (Honours) at the prestigious Bankura Christian College, affiliated to The University of Burdwan. All these three years, I had rigorous course work that shaped me into a budding researcher and mathematician. Rational thinking to solve a mathematical problem, systematic planning, analyzing, hypothesizing and interpretation were some of the skills I developed during this time. By the end of my undergraduate degree, I had gained a sound knowledge of mathematics and the world of research.

With the knowledge and skills acquired during my bachelors, I qualified a highly competitive examination JAM to secure a seat in the IIT Ropar, Punjab, which is one of India's top institutes for technology and research.

At IIT Ropar, I took up rigorous course work and lab work that introduced me to cutting-edge technologies and research at the professional level. Along with mathematics, I explored some computer science courses here. For my M.Sc. thesis project I worked under supervision of Dr. Balesh Kumar. My thesis is entitled "Algebraic Number Theory". In this project I have explored Field theory and worked on some algorithms of Number theory, which have lots of importance to work with modern day Cryptographic protocols.

Using the knowledge and skills acquired during my masters, I qualified the Graduate Aptitude Test in Engineering (GATE), a highly competitive examination in India. And secured AIR 25 to obtain a seat in the IIT Kharagpur, Kharagpur which is one of India's top institutes for technology and research.

At IIT Kharagpur, I took up rigorous course work and lab work that shaped my computer science knowledge to research at the professional level. During this time, I enhanced my coding skills in several languages. For my M.Tech thesis project I worked under supervision of Dr. Ratna Dutta. My thesis is entitled "The Study of Transparent zkSNARK for R1CS". In this project, I independently worked on IOP

construction and transparent Zero Knowledge Proofs, which have huge importance in Blockchain technology. Along with my M.Tech project, I was simultaneously working on "The Study of Scalable, Transparent Argument Systems(STARK)" as an intern student under one Dr. Ratna Dutta's project. I worked on scalable, transparent proof systems for computational integrity problems, which have lots of importance in Blockchain technology. I am also working on implementation of a STARK proof for a large Fibonacci sequence computation.

From all my previous projects, I gained some experiences in Blockchain and Cryptographic protocols. Also I was always interested in working with MPC and trying to learn about it independently. So I was looking for some opportunity related to both MPC and Blockchain for some time. And finally when I came to know about the project "Cryptographic Protocols and Blockchains - Overcoming multiparty computation impossibilities using a distributed ledger ", I was really amazed. So I wanted to pursue a PhD in this project as it is an excellent match for my interest and experiences.

I had a good balance between academics and extracurricular sports activities. I play cricket, football, and volleyball. And organized a few cultural programmes and events at IIT Ropar and IIT Kharagpur. All these experiences have shaped me into a responsible, hardworking, and passionate individual.

In the next ten years, I envision myself as a research scientist working, innovating, and developing new tools to make our virtual world more secure. I will be extremely excited to extend my education in the Joint Doctoral Degree Program with you and I believe I will make a positive impact on fundamental research driven by curiosity and passion.

Sincerely,

Suman Ghosh
Computer Science and Data Processing
Indian Institute of Technology Kharagpur