




# Bhumika Mittal

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## EDUCATION

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### Ashoka University

*DipASR: Diploma in Advanced Studies and Research, Computer Science*  
Thesis Advisor: Prof Mahavir Jhawar

Sonipat, India  
2024 – Present

### Ashoka University

*Bachelor of Science (Honours), Computer Science; CGPA: 3.90/4.00*  
Minor in Mathematics, Entrepreneurial Leadership and Strategy

Sonipat, India  
2021 – 2024

## RESEARCH EXPERIENCE

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### Max Planck Institute for Software Systems

*Visiting Research Fellow*

Saarbrücken, Germany  
May 2024 – Present

- Analyzing graph data access patterns during the execution of algorithms
- Investigating a multi-threaded database system to store graphs with an underlying unrolled skip-list data structure
- Benchmarking state-of-the-art graph processing systems capable of serving various graph workloads (analytics, traversals, and pattern matching) on dynamic graphs with transactional updates

### Ashoka University

*Research Intern*

Sonipat, India  
Nov 2023 – May 2024

- Designed and implemented an indigenous lattice-based public key encryption and signature scheme
- Studied and presented a comprehensive report on NIST PQC finalists
- Project supported by Centre for Artificial Intelligence and Robotics, DRDO

### IIT Gandhinagar

*Research Assistant*

Remote  
May 2023 – Sept 2023

- Designed a dedicated hardware accelerator tailored for encoder-based models
- Simulated various architectures using simulators like Timeloop
- Area of work - Computer Architecture, Systems for ML, Deep Neural Networks

### Lehigh University

*Research Assistant*

Bethlehem, US  
May 2022 – Jun 2022

- Consulted Global Good Funds, a venture capital firm
- Established clear and identifiable metrics to evaluate ESG impact
- Measured the non-monetary impact for ESG goals of the ventures
- Strategized the optimal investment approaches for the Global Good Fund

### Program in Mathematics for Young Scientists

*Mehta Fellow*

Remote  
Summer 2020, 21

- Research project on de Bruijn Sequences proposed by Prof Matt Baker
- Completed Number Theory and Advanced Graph Theory course involving daily lectures and problem sets
- Exploratory Project on Fibonacci sequences

## ACADEMIC WORK

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### SEAL-ME: Secure, Energy-Efficient Accelerator Design for Language Models

*Tom Glint, Bhumika Mittal, Santripa Sharma, Abdul Ronak, Aravind Krishna, Joyce Meki*

*in review*

- Proposed a Near Data Processing paradigm-based accelerator design which achieves a 1.2x speedup, a 58% reduction in area, and a 9x reduction in power compared to the state-of-the-art edge DNN accelerator and seamlessly integrates on edge devices

### On the Existence of Balanced Generalized de Bruijn Sequences

*Bhumika Mittal, Haran Mouli, Eric Tang, and Matthew Baker*

Discrete Mathematics Journal  
April 2023

- A balanced generalized de Bruijn sequence with parameters  $(n, l, k)$  is a cyclic sequence of  $n$  bits such that (a) the number of 0's equals the number of 1's, and (b) each substring of length  $l$  occurs at most  $k$  times. Determine necessary and sufficient conditions on  $n, l$ , and  $k$  for the existence of such a sequence.

## PROJECTS

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### Anonymous Credentials | [GitHub](#)

- Explored privacy protecting authentication along with theoretical understanding and proof of security
- Implemented a zero-knowledge proof of knowledge based on Schnorr sigma protocol

### Number Theoretic Transform | [GitHub](#)

- Wrote a detailed expository report on Number theoretic transform
- Implemented recursive/iterative Cooley Tukey, Gentleman-Sanderson algorithms for cyclic and negacyclic convolutions

### UNIV - An Ethereum Based Game | [GitHub](#)

- Developed and deployed AshokaToken (ASH), an ERC20 token, and a user-friendly frontend application
- Integrated MetaMask wallet connectivity enabling users to participate in a quiz game and exchange the tokens won through Automated Market Makers like Uniswap

### BPHR - Blockchain-Powered Health Rewards | [GitHub](#)

- Implemented a reward system application on Hyperledger Fabric
- Implemented features include reward listing, outlet registration, user purchase registration with specified dates, outlet validation of purchases, and reward redemption

## TEACHING EXPERIENCE

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### Ashoka University

Sonipat, India

5 × Teaching Assistant

- Undergraduate Teaching Assistant for the following courses:
  - \* Technology Law and Policy (Spring 2024)
  - \* Data Structures (Monsoon 2024)
  - \* Discrete Mathematics (Spring 2023)
  - \* Strategy through Board Games (Spring 2023)
  - \* Introduction to Computer Programming (Monsoon 2023)
- Student Feedback: 4.88/5

### Plaksha University

Mohali, India

Teaching Staff

April 2023 - June 2023

- Curated and taught a course on Microcontrollers to 200+ high school students
- Designed Game Dev Module - built 5 mathematical and hardware games
- Helped students build various IoT Projects using ESP32 chipset and other electronic components

### Lodha Genius Program

Sonipat, India

Teaching Assistant

May 2023 - June 2023

- Worked closely with Siddharth Kankaria (from NCBS) to prepare and deliver a course on Science Communication
- Assisted 50+ students with their science communication projects and Olympiad-level math problem sets
- Organised and managed the programme logistics

## WORK EXPERIENCE

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### Atlas Fellowship

Remote

Talent Coordinator

Aug 2022 - Oct 2022

- Strategised the Outreach for the Atlas Fellowship launch in India.
- Ran a campaign and managed a team of 12 to reach out 2500 top schools and 3000 coaching centres in India.
- Achieved the 148% increase in applications for the program.

### Young Scholars Programme (YSP)

Sonipat, India

Office Counselor

May 2022

- Developed an infrastructure for the program by integrating different platforms
- Automated various processes for the program including workshop allocation, letter sharing, etc.

### Brand warikoo

Remote

Tech and Product Intern

Feb 2021 - April 2022

- Ideated and built the *WebVeda* platform for the courses, which hosts 300k learners and helped in generating revenue of \$1Mn within 10 months.
- Managed different tech aspects of the brand, including payment gateway, email integration, etc.

## HONORS AND AWARDS

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- 2024 **Summa Cum Laude**, Ashoka University  
2024 **Silver Medalist**, Department of Computer Science, Ashoka University  
2024 **Builder's Award**, Department of Computer Science, Ashoka University  
2021-24 **Dean's List** (every semester), Dean of Academic Affairs, Ashoka University  
2022 **Undergraduate Research Excellence Award**, Department of Mathematics, Ashoka University  
2019 **Most Powerful and Serene (Best Student) Award**, Maheshwari Girls Public School  
2019 **Winner**, National Ideationology Challenge  
2018 **Best in IT**, Maheshwari Girls Public School  
2018 **School Topper**, National Cyber Olympiad

## OTHER ACTIVITIES

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- Undergrad Architecture Mentoring Workshop (uArch)** ISCA 2024  
*Full Grant Recipient* June 2024
- Received a full grant to attend 6th uArch 2024 and ISCA conference
- Workshop on Lattice-based Post-quantum Cryptography** Ashoka University  
*Speaker, Organiser* April 2024
- Organised a 2-day Workshop with various speakers and talks on PQC
  - Gave a talk on Number Theoretic Transform: Implementation Issues
- Academic Affairs Board** Ashoka University  
*CS Student Representative* May 2023 – May 2024
- Worked with the Department of Computer Science, and the Academic Advisory Board to strengthen the quality of the undergraduate major and the department
- IEEE Ashoka Student Branch** Ashoka University  
*Co-director of IT* Aug 2023 – May 2024
- Lead tech projects and conducted Computational Sciences workshop to promote the STEM culture
  - Organised an intercollegiate STEM fest - Chimera
- Undergraduate Science Research Fest** Ashoka University  
*Student Organiser* Jan 2024 – Feb 2024
- Organised the poster presentation session, sci-art, and guest invites for a science fest
- ACM SPLASH 2023** Virtual  
*Student Volunteer* Sept 2023 – Oct 2023
- Working with the organizers as a student volunteer to organise SPLASH conference
- Computer Science Society** Ashoka University  
*Student Advisor, Interim President* Aug 2022 – May 2024
- Spearheaded the team of 50+ active members to rebuild and foster the CS culture at the university through weekly workshops and various events
- Entrepreneurship Club** Ashoka University  
*Director of Events* Jan 2022 – May 2023
- Ideated and organised various events, like Startup Ashoka, to encourage entrepreneurial spirit among students
- Mathematics Colloquium** Ashoka University  
*Speaker* April 2022
- Presented my paper on deBruijn sequences to senior undergraduates, Ph.D. students and faculty members

## TECHNICAL SKILLS

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- Programming:** C/C++, Java, JavaScript, Python3, Solidity, Assembly, HTML/CSS, Shell, SML, SQL, XML, React.js  
**Tools:** Qiskit, Hyperledger Fabric, Timeloop/Accelergy, Docker, Git, L<sup>A</sup>T<sub>E</sub>X  
**Others:** Arduino, ESP32, Raspberry Pi Pico, PowerBi, WordPress, MS Excel  
**Languages:** Hindi, English