

# Bhumika Mittal

@ bhumika.mittal\_ug24@ashoka.edu.in |  mittalbhumika7 |  bhumikamittal7 |  bhumikamittal.in

## EDUCATION

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### Ashoka University

Bachelor of Science, Computer Science; CGPA: **3.87**/4.00  
Minor in Mathematics, Entrepreneurial Leadership and Strategy

Sonipat, India

2021 – Present

### Maheshwari Girls Public School

High School Diploma; AISSCE (Science Stream): 95.4%

Jaipur, India

2018 – 2020

## RESEARCH EXPERIENCE

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### Max Planck Institute for Software Systems

Visiting Research Fellow

Saarbrücken, Germany

May 2024 – Present

### Centre for Artificial Intelligence and Robotics

Research Intern

Sonipat, India

Nov 2023 – Present

- Designed and implemented an indigenous lattice-based public key encryption and signature scheme
- Studied and presented a comprehensive report on NIST PQC finalists

### 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

## PUBLICATIONS

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### Edge-Aware Language Model Acceleration

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

- 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 sande 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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2022	<b>Undergraduate Research Excellence Award</b> , Department of Mathematics, Ashoka University
2021-23	<b>Dean's List</b> (every semester), Dean of Academic Affairs, Ashoka University
2022	<b>AWS AI &amp; ML Scholarship</b>
2019	<b>Most Powerful and Serene (Best Student) Award</b> , Maheshwari Girls Public School
2019	<b>Winner</b> , National Ideationology Challenge
2018	<b>Best in IT</b> , Maheshwari Girls Public School
2018	<b>School Topper</b> , National Cyber Olympiad
2017	<b>Runner-up</b> , District Level Shot Put Competition

## OTHER ACTIVITIES

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<b>Undergrad Architecture Mentoring Workshop (uArch)</b> <i>Full Grant Recipient</i> <ul style="list-style-type: none"><li>Received a full grant to attend 6th uArch 2024 and ISCA conference</li></ul>	ISCA 2024 <i>June 2024</i>
<b>Workshop on Lattice-based Post-quantum Cryptography</b> <i>Speaker, Organiser</i> <ul style="list-style-type: none"><li>Organised a 2-day Workshop with various speakers and talks on PQC</li><li>Gave a talk on Number Theoretic Transform: Implementation Issues</li></ul>	Ashoka University <i>April 2024</i>
<b>Academic Affairs Board</b> <i>CS Student Representative</i> <ul style="list-style-type: none"><li>Worked with the Department of Computer Science, and the Academic Advisory Board to improvise the CS culture at Ashoka</li></ul>	Ashoka University <i>May 2023 – May 2024</i>
<b>IEEE Ashoka Student Branch</b> <i>Co-director of IT</i> <ul style="list-style-type: none"><li>Lead tech projects and conducted Computational Sciences workshop to promote the STEM culture</li><li>Organised an intercollegiate STEM fest - Chimera</li></ul>	Ashoka University <i>Aug 2023 – May 2024</i>
<b>Undergraduate Science Research Fest</b> <i>Student Organiser</i> <ul style="list-style-type: none"><li>Organised the poster presentation session, sci-art, and guest invites for a science fest</li></ul>	Ashoka University <i>Jan 2024 – Feb 2024</i>
<b>ACM SPLASH 2023</b> <i>Student Volunteer</i> <ul style="list-style-type: none"><li>Working with the organizers as a student volunteer to organise SPLASH conference</li></ul>	Virtual <i>Sept 2023 – Oct 2023</i>
<b>Computer Science Society</b> <i>Student Advisor, Interim President</i> <ul style="list-style-type: none"><li>Spearheaded the team of 50+ active members to rebuild and foster the CS culture at the university through weekly workshops and various events</li></ul>	Ashoka University <i>Aug 2022 – May 2024</i>
<b>Entrepreneurship Club</b> <i>Director of Events</i> <ul style="list-style-type: none"><li>Ideated and organised various events, like Startup Ashoka, to encourage entrepreneurial spirit among students</li></ul>	Ashoka University <i>Jan 2022 – May 2023</i>
<b>Mathematics Colloquium</b> <i>Speaker</i> <ul style="list-style-type: none"><li>Presented research paper on deBruijn sequences to senior undergraduates, Ph.D. students and faculty members</li></ul>	Ashoka University <i>April 2022</i>

## 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