

SAUMYA MATHUR

Indian Institute of Technology (BHU), Varanasi

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EDUCATION

Indian Institute of Technology (BHU), Varanasi	Nov 2020 – Present
<i>Dual Degree in Biochemical Engineering and Biotechnology (Honours), Minor in Applied Mathematics</i>	<i>9.54/10</i>
Bharatiya Vidya Bhavan's Vidyashram, Jaipur	Jul 2005 – Jun 2020
<i>All India Secondary School Certificate Examination</i>	<i>95.6%</i>

RESEARCH INTERNSHIPS

Harvard Medical School, Boston	May 2024 – Jul 2024
<i>Khorana Scholar, BCMP Summer Scholar</i>	
<ul style="list-style-type: none">• Yeast Strain: Made a yeast strain with auxin & beta-estradiol sensitive degron tagged SUA7 with fluorescent Rpb1 for single molecule microscopic studies of its nuclear extract• Protein Preparation: Engineered and labeled mutated SUA7 proteins to study the assembly of the Pre-Initiation Complex on the promoter region and SUA7's interactions with other transcription factors by single-molecule microscopy	
Max Planck Institute of Biochemistry, Munich	May 2023 – Jul 2023
<i>DAAD-WISE Summer Research Intern</i>	
<ul style="list-style-type: none">• Histone Deposition by Studies: Expressed and labelled H2A/H2B & H3/H4 histones and performed single molecule microscopy and bulk assays to understand the role of CAF-1 in histone deposition• Plasmid Design & Construction: Designed a 47kbp plasmid DNA derived from lambda DNA for single-molecule topological investigations, employed techniques like In-Fusion Cloning, gradient PCR, Miniprep, and Gel Extraction• DNA Nick Sensor Development: Engineered and labeled a mutated <i>Chlorella Virus</i> DNA ligase as a prospective DNA Nick Sensor in single-molecule microscopy, employing Fast Protein Liquid Chromatography for protein purification	
Indian Institute of Technology, Roorkee	May 2022 – Jul 2022
<i>SPARK Summer Research Intern</i>	
<ul style="list-style-type: none">• Bioinspired Computational Geometry: Employed MATLAB to create a Nacre-inspired Centroidal Voronoi Tessellation, optimized using Lloyd's Algorithm, as the fundamental unit for military blast-mitigating materials• Finite Element Analysis: Used Hypermesh to generate meshes, modeled layers in LS-DYNA to mimic the brick-and-mortar structure of Nacre and analysed their performance under static loading conditions• Poster Presentation: Conducted an extensive Literature Review on Biomimetic Energy Absorption & summarized the findings from my Computational Experiments in a poster and presented it to the institute's professors & scholars	

PROJECTS

Complementary Phage Therapy for Colistin-resistant <i>K. pneumoniae</i>	Jul 2022 – Nov 2023
<i>Guide: Prof. Vikash Kumar Dubey, School of Biochemical Engineering, IIT (BHU)</i>	
<ul style="list-style-type: none">• Molecular Docking: Conducted molecular docking of the T4 Long Tail Fiber receptor-binding tip with L-Ara4N & pEtN, responsible for Colistin resistance in <i>K. pneumoniae</i>, using AutoDock• Mutant Prediction: Used Rosetta Design for predictive modeling to forecast mutations within the tail-fiber's binding site, enhancing its affinity for L-Ara4N & pEtN, and performed docking studies• Molecular Dynamics: Performing Molecular Dynamics studies using GROMACS, employing advanced techniques like Enhanced Sampling and Umbrella Sampling for the tail-ligand complex	
Development of a Chemical Biosensor for Amino Acid Detection	Jul 2021 – Dec 2021
<i>Guide: Prof. Pranjal Chandra, School of Biochemical Engineering, IIT (BHU)</i>	
<ul style="list-style-type: none">• Density Functional Theory: Performed DFT calculations on Glycine and Pyrrole molecules using Gaussian 09• Literature Review: Thorough study of biosensor principles, conducting polymers, carbon dots, and DFT• Molecule Editing: Designed molecules using Avogadro, PyMOL and GaussView	

RELEVANT COURSEWORK

- Molecular Biology & Genetic Engineering
- rDNA Technology
- Fundamentals of Microbiology
- Introduction to Biology
- Introduction to Bioinformatics
- Enzyme Engineering
- Advances in Biochemistry
- Structural Biology
- Computational Drug Design
- Microbial Engineering
- Computer Science & Programming
- BioMEMS & Biosensors
- Numerical Solutions to PDEs
- Bioinstrumentation
- Computational Material Physics
- Linear Algebra

SKILLS

Lab Techniques: Cloning, Protein Expression & Purification, Single Molecule Microscopy, Bulk Assays, DNA Purification

Languages: Python, MATLAB, C++, HTML/CSS

Computational Tools: AutoDock, GROMACS, Gaussian 09, PyMOL, ImageJ, Adobe Illustrator, Microsoft Office

Soft Skills: Speed Reading, Content Writing, Problem Solving, Interpersonal Communication, Teamwork, French (A1)

POSTER PRESENTATIONS

Mechanics of CAF-1 Histone Deposition during Chromatin Assembly

Sep 2023

Eukaryotic DNA Replication & Genome Maintenance Conference, CSHL

Laurel Hollow, NY

Bioinspired Material Design for Energy Dissipation

Jul 2022

SPARK Student Academic Conference, IIT Roorkee

Roorkee

POSITIONS OF RESPONSIBILITY

Events Head

Jun 2021 – Present

Research Cell, IIT (BHU)

Varanasi

- **Organizing Committee:** Leading member of the cell's Events & Podcast Teams, organising weekly discussions, workshops, and competitions to make research more accessible & fun for 1000+ students
- **Research Mentorship:** Led a Research Mentorship Programme for sophomores with 170+ mentees & 60+ mentors, providing essential guidance for research at an early stage; personally mentoring 10+ students in their journey
- **AMA Host:** Hosted multiple sessions with accomplished alumni in research for audiences with 500+ students, made scientific communication more accessible for the Cell
- **Content Writer:** Composed posts containing useful information about scholarships, applications, & programs, as well as scientific updates for the Cell's social media handles

Student Member

Aug 2023 – Present

Department Undergraduate Committee, School of Biochemical Engineering, IIT (BHU)

Varanasi

- **Student Representative:** Put forth student interests and needs in front of the faculty members & administration, ensuring that the concerns and needs of the students are effectively addressed & resolved
- **Policy Review and Revision:** Conduct a comprehensive assessment of academic policies within the Undergraduate (UG) ordinance and propose revisions to better align with student needs

Head Girl

Apr 2019 – Jul 2020

Bharatiya Vidya Bhavan's Vidyashram

Jaipur

- **National Integration Camp:** Organised a week-long National Integration Camp for 500+ students from across the country with cultural workshops, lectures by eminent speakers & educational visits
- **Clubs & Activities:** President of the Quiz Club, Editor of the Annual School Magazine, Member of the Astronomy Club & the Ecology Club

HONOURS & ACHIEVEMENTS

- Department Rank 1 of the School of Biochemical Engineering at IIT (BHU), Varanasi
- Awarded the Khorana Scholarship by the Indo-US Science & Technology Forum, Winstep Forward & the Department of Biotechnology, Govt. of India for the Summer of 2024
- Awarded the DAAD-WISE Scholarship for the Summer of 2023
- Scholar of the MITACS Global Research Internship 2023
- Gold Medalist at the Inter-IIT Tech Meet 9.0 in the Drishtee Tech-Led Innovation for Rural Entrepreneurs
- 2nd Runner Up in the Industry Analysis Competition, FinFest, organised by FinShiksha and IIT Bombay, Delhi, Kanpur, Roorkee, Guwahati and (BHU).
- One of the 60 SPARK Summer Interns at IIT Roorkee in 2022 out of over 14,000 applications