

Megha Roy

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EDUCATION

Indian Institute of Science (IISc)

Master of Science in Chemical Sciences

Master's Project Conducted in the Department of Materials Engineering

Bangalore, India

2024 - 2026

- **Master's Thesis:** Engineered oxidized pectin hydrogels via dynamic covalent crosslinking for advanced wound healing applications.
- Developed functionalized polymer networks using carbohydrazide and tannic acid-mediated crosslinking, followed by dialysis purification and lyophilization.
- Characterized network porosity, chemical transformations, and viscoelastic behaviour using ATR-FTIR, SEM, and rheological profiling (shear-thinning and thixotropic recovery).
- Evaluated mechanical performance on a Universal Testing Machine (UTM), swelling and degradation kinetics, and extrusion-based 3D bioprinting.
- Evaluated *in vitro* antimicrobial potency against *S. aureus* and *E. coli* via agar well diffusion and broth microdilution.

Miranda House, University of Delhi

Bachelor of Science (Honours) in Chemistry

Graduated with First Class Honours

New Delhi, India

2021 - 2024

CGPA: 8.04 / 10.0

- Core courses in organic synthesis, physical chemistry, analytical instrumentation, and coordination chemistry.
- Awarded 1st Prize in Eureka Paper Presentation Competition (*Pratikriya*) for work on quantum dots.

RESEARCH WORK EXPERIENCE

Indian Institute of Science (IISc)

Master's Project Intern, Department of Materials Engineering

Supervisor: Prof. Kaushik Chatterjee (Chair, Bioengineering Department)

Bangalore, India

Jul 2025 – Present

- Synthesised dynamic covalent polysaccharide-based hydrogel matrices targeted for soft tissue repair and wound dressing applications.
- Regulated polymer crosslinking density optimizes matrix degradation and mechanical elasticity; evaluated compressive and tensile profiles using UTM.
- Conducted *in vitro* antimicrobial efficacy assays, including minimum inhibitory concentration (MIC) and agar well diffusion tests.
- Formulated optimized shear-thinning bio-inks for high-fidelity scaffold fabrication using the CELLINK BioX 3D bioprinter.

CSIR – Indian Institute of Chemical Biology (IICB)

Research Intern

Supervisor: Dr. Arindam Talukdar

Kolkata, India

May 2025 – Jun 2025

- Designed and executed a PROTAC-based targeted protein degradation strategy against ASK1 for Non-Alcoholic Fatty Liver Disease (NAFLD). Synthesized Selonsertib-derived target ligands coupled with CRBN/VHL E3 ligase recruiters through multi-step organic synthesis.
- Purified reaction intermediates using thin-layer chromatography (TLC), flash column chromatography, and monomode microwave synthesis.
- Elucidated structures via ^1H NMR, ^{13}C NMR, Mass Spectroscopy and FT-IR spectroscopy; performed molecular modeling using ChemSketch and ArgusLab.
- Gained hands-on experience in ubiquitin-proteasome system (UPS) assays and murine *in vivo* dosing techniques (oral gavage, IP injections).

Hansraj College, University of Delhi & HeteroChem Innotech

Research Intern, Har Gobind Khorana Centre for Chemical Biology

New Delhi, India

May 2023 – Jul 2023

- Synthesized industrial heterocycles using green chemistry principle and analyzed atom economy and synthetic efficiencies.
- Purified compounds via rotary evaporation and column chromatography, monitoring reaction kinetics through TLC and NMR.
- Screened genomic databases and gene sequencing sample spaces to correlate target binding sites with drug candidates.
- Presented a paper on therapeutic frontiers for Sickle Cell Disease (SCD) at the 2nd Indo-US Symposium on Chemical Biology and Drug Discovery.

AWARDS & ACHIEVEMENTS

- **National Competitive Examinations:** Qualified IIT-JAM (Chemistry), NEET, CUET PG, WB JEE and JEE.
- **1st Winner of the Prize:** Eureka Paper Presentation Competition (*Pratikriya*), Miranda House, University of Delhi.
- **Green Olympiad (Level-02):** Successfully cleared national environmental examination.
- **Conference Presentations & Attendance:** Presented research at the 2nd Indo-US Symposium on Chemical Biology and Drug Discovery; attended IUPAC International Women Breakfast & Recent Trends in Chemical Sciences (2023), ICBTM 2.0, and ICBTM 3.0.

SELECTED LEADERSHIP & ENGAGEMENT

UK-India Summit on 3D Printing and Tissue Engineering

IISc Bangalore

Organizing Committee Member

2025

- Coordinated technical sessions, invited speaker hospitality, and schedule logistics for academic delegates and researchers.

University of Delhi Vice Chancellor Internship Scheme

New Delhi, India

Administrative Intern, Department of Philosophy

Jan 2023 – Jun 2023

- Maintained financial ledgers, audit vouchers, and budget reconciliation records for departmental administrative operations.
- Conducted community education and mentoring for underprivileged students; active volunteer in Umeed NGO and MH Vatavaran.

SKILLS

- **Biomaterials & Wet Lab:** Dynamic covalent hydrogels, Polymfunctionalization, Dialysis, Lyophilisation, CELLINK BioX 3D bioprinting, Inorganic and Organic Synthesis, Optimising protocols.
- **Analytical Instrumentation:** Rheology (Anton Paar), Universal Testing Machine (UTM), ATR-FTIR, SEM, ¹H & ¹³C NMR, UV-Vis, TLC.
- **In Vivo & Assays:** Small animal handling (oral gavage, IP injections), Antimicrobial evaluation (MIC, agar well diffusion).
- **Computational & Software Tools:** Python, MATLAB, OriginPro, BioRender, ChemSketch, Overleaf, Argus-Lab, Microsoft Office Suite.