

AGRIMA DEEDWANIA

DPhil Interdisciplinary Bioscience, BBSRC DTP
B.Tech, Biochemical Engg. and Biotechnology, IIT Delhi
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EDUCATION

University of Oxford
DPhil Interdisciplinary Bioscience, BBSRC DTP

September 2023- Present

Indian Institute of Technology Delhi
B.Tech. Biochemical Engineering and Biotechnology

July 2018 - May 2022
Overall GPA: 8.362/10

PUBLICATIONS

- **Deedwania A**, Karmakar S, Kumar V, Shefrin S, Sundar D, Srivastava P. Construction and characterization of a temperature-sensitive pRC4 replicon for *Rhodococcus* and *Gordonia*. *Gene*. 2023 Nov 15:147990. doi: 10.1016/j.gene.2023.147990. Epub ahead of print. PMID: 37977321.

INDUSTRY EXPERIENCE

Inito¹
Biotech Junior Research Scientist

June 2022- present

- Worked on **Lateral Flow Blood Assays**, primarily solved the issue of RBC interference in LFAs.
- Established an antibody production system and **engineered antibodies** for LFAs using bioinformatics tools to **reduce the cost and increase the sensitivity and stability** of the existing product.

PROJECTS AND RESEARCH

Construction of Temperature Sensitive Plasmid Replicon for *Gordonia* ²: (dry, wet lab)
Guide: Prof Preeti Srivastava (DBEB, IIT Delhi) (March 2021-August 2022)

- Predicted the **TS mutant** of repB protein of pRC4 replicon using bioinformatics tools.
- Performed **homology modeling** and **DNA-Protein docking** to predict and compare interactions.
- Performed **mutagenesis** of WT repB protein and screened for TS phenotype in *Gordonia* and *Rhodococcus*.

ssDNA Export from Synthetic Cell and Linker Induced Fusion of Cells³: (dry lab)
Guide: Prof Richard M. Murray (CDS and Bioengineering, Caltech) (May 2020-August 2020)

- Studied **import/ export** of molecules and membrane protein transport channel in a synthetic cell.
- Designed an efficient protocol for **inducible gene expression** of the membrane transport channel.
- Designed protocol for **export of ssDNA** and **fusion of two cells** induced by the exported DNA.

RNA Thermometers⁴: (dry, wet lab)
Guide: Prof Shaunak Sen (Department of Electrical Engineering IIT Delhi) (Aug 2019- December 2020)

- Designed **nucleic acid structures and melt profile** of RNA thermometers at different temperature.
- Experiments of protein expression of thermometers like rpoH, agsA, cspA at different temperatures.

¹<https://www.inito.com/>

²Publication: available online, ahead of print: <https://doi.org/10.1016/j.gene.2023.147990>

³https://github.com/agrimadeedwania/DNAexp_vesiclefusion.git

⁴https://drive.google.com/file/d/1GAv7znhaoEh_yGDTGvmZoGoohVQtMwY/view?usp=sharing

SKILLS AND STRENGTHS

- **Dry-lab Skills:** Homology modeling, Docking, MD Simulations, CRN Modelling and simulation
- **Wet-lab Skills:** Estimation, extraction and purification of nucleic acids, proteins, lipids, chromatography, cloning, electrophoresis, mutagenesis, PCR, DNA and RNA isolation, Chemical competent and electrocompetent bacterial cell preparation, transformation, fluorimetry, bacterial staining, bacterial growth analysis, microscopy, ELISA, Biochemical assay
- **Languages:** Python, C/C++

RELEVANT LABORATORY COURSES

- **Biochemistry** - Estimation of proteins and nucleic acids; Extraction of lipids; Gel filtration and Ion exchange chromatography; Gel electrophoresis; DNA extraction and purification, enzyme kinetic analysis
- **Microbiology** - Morphological study of bacteria and bacterial spores by staining; biochemical identification of microorganisms; direct and indirect ways of counting microbes; bacterial growth.
- **Introductory Biology** - Response of cells and plant tissues in different solutions; Observing cells using light and fluorescence microscopy; SDS PAGE, Agarose gel electrophoresis.
- **Bioinformatics** - Accessing various biological databases, analyzing DNA, RNA and Protein Sequences in Databases, find Regulatory Motifs in DNA, sequence alignment, sequence comparison, Homology modelling, Docking, MD Simulation
- **Molecular Biology** - Plasmid extraction, Genomic DNA extraction, Gel Electrophoresis, PCR, Restriction Digestion, gel extraction, Cloning, Competent cell preparation, transformation, protein expression
- **Bioprocess Engineering** - Sterilization, Sugar estimation using DNS, determining reactor kinetics, mining time, dissolved oxygen, oxygen transfer coefficient in bioreactors and fermenters
- **Recombinant DNA Technology** - Sequence retrieval, primer design, various tagging, luciferase assay, mutagenesis, siRNA design, qPCR, mammalian cell transfection

EXTRA-CURRICULAR ACTIVITIES

Synthetic Biology:

(Aug 2021- May 2022)

- **Gold Medal Winner** at iGEM Grand Jamboree competition 2022 for the lead recovery project⁵. **Advisor** and Mentor for the IIT-Delhi team.
- Formalized the **Synthetic Biology club** at Institute level, procured lab space, funding for the team and iGEM 2022 competition.
- **Overall Coordinator** of the team, lead and trained a team of 20 undergraduate students.
- **Ideated the project** of lead detection and recovery via a biosensor for iGEM 2022 competition, **trained wet lab and dry lab techniques** to the undergraduate students.
- **Conducted events** like quizzes, workshops and seminars at institute as well as various schools to increase interest in synthetic biology.

Sports:

(Aug 2018-May 2022)

- **Institute Badminton Captain** (2021-2022)- Lead a team of 5 students, held regular badminton practices and won **silver medal** at Sportech 2022.
- **General Championship** winner, Honoured by a **Silver Coin** for a significant contribution at **annual Inter-IIT Sports Meet 2018**.

Indradhanu:

(January 2019-May 2022)

- Formalized the **LGBTQ+** student body at the institute level; working to **create a safe and inclusive space** for the students.
- Successfully organised the **first IIT Delhi Pride March** in 2019. Also conducted various events like movie screening, workshops, poster making for increasing awareness among the IIT Delhi community throughout the year.

⁵<https://2022.igem.wiki/iit-delhi/>