Gunja Gupta *B.Tech in Life Sciences (Final year)*

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EDUCATION

Atria University Nov 2021 – Nov 2025 | Bengaluru, India
Bachelor of Technology (B.Tech) Life Sciences
Cumulative CGPA: 8.34/10
Relevant Coursework: Cancer Biology, Systems Biology and Mathematical modelling, Molecular Biology, Immunology, Biochemistry, Genetics and Recombinant DNA Technology, Cell Biology, Microbiology, and Bioinformatics.

Avasara Academy 2018 – 2021 | Pune, India
IGCSE and AS/A levels - Cambridge

SKILLS

Bioinformatics/Computational: Programming languages (Python, R) • Cytoscape • Bioinformatics tools & software (BLAST, Clustal, Mfold, MUSCLE, Snapgene) • Databases (NCBI, Uniprot/Swiss-Prot, SGD, Intogen, TCGA) • Sequence analysis (multiple sequence alignment) • Trancriptional/mutational analysis • WGCNA analysis • Flux balance analysis • Mathematical modelling (biological networks as ODE) using python • ARACNe

Molecular Biology: Polysome profiling • PCR • RT-PCR • Mini prep • DNA/RNA extraction • Gel electrophoresis • Epitope tagging • Cloning & transformation • Competant cell preparation • Reporter Gene Assays

Cell Biology: Mammalian & microbial cell culture • Cell Assays • Cell migration and invasion assay (scratch assay) • Transfection • Cell engineering

Biochemistry: Western Blot/SDS Page • ELISA • BCA assay • Chromatography • Spectrophotometry • Centrifugation (Ultracentrifuge)

Microbiology: Aseptic microbial culture techniques • Staining • Antimicrobial susceptibility testing • Biochemical tests

Microscopy/Imaging: Fluoroscence/Inverted/Light Microscopy • Cell counting (hemocytometer)

Scientific research/writing: Reading & summarizing research papers • Documentation (Zotero) • Formulating research questions and hypotheses • Designing & troubleshooting experiments

Lab Etiquettes: Lab cleaning • Maintaining lab notebook • Troubleshooting • Knowledge of laboratory safety

RESEARCH EXPERIENCES

Advanced Centre for Treatment, Research and Education in Cancer (ACTREC, TMC) | Dr. Sunil Shetty Mar 2024 – Jul 2024 | Mumbai
Project Trainee
"Ribosome heterogeneity: Exploring how stress response influences the differential expression of duplicated ribosomal protein genes (dRPGs) in *S. cerevisiae*."

- Conducted computational analysis to identify structural differences in RPs. Analysed 74 RPs available on SGD.
- Investigated the expression patterns of epitope tagged RP candidates under different stress conditions through immunoblotting experiments.
- Assisted with conducting polysome profiling of tagged RPs: a) To screen for RPs whose expression is regulated by Rapamycin, a selective inhibitor of mTOR protein kinase. b) To evauate the tranlsation efficiency of cells under stress.

BioSphere | Mr. Prem Anurag Sep 2024 – present | Delhi
Part - time Intern
"Antibody coated nanoparticle-based molecular cancer diagnostic kit"

This project aims to develop a novel nanotherapeutic conjugate consisting of cobalt oxide coated with fluorescent biomolecules (Umbelliferone), which selectively bind to cancer cells. My tasks involve:

- Conducting comprehensive literature reviews, focusing on current research and advancements in cancer diagnostic kits.
- Performing in-silico data collection and analysis to support ongoing research projects.
- Contributing to the design, development of components, and quality assurance of a cancer diagnostic kit prototype, ensuring it meets project specifications.

DNAi World (CCAMP) | Dr. Malali Gowda Jun 2023 – Dec 2023 | Bengaluru
Bioinformatics Associate

- Conducted in-depth research on brain cancer, focusing on tumor types and genetic/epigenetic alterations.
- Built catalogues of 1,000's of data points on diet and lifestyle effects on tumorigenesis. Developed a Python program to extract paper abstracts.

PROJECTS

Systems biology and mathematical modelling | Dr. Saurabh Mahajan Nov 2024 – present

- Identified and ranked key transcription factors as master regulators driving Alzheimer's disease-specific gene expression. Constructed (using ARACNe) and visualised (using Cytoscape) gene regulatory networks and inferred protein activity levels (using VIPER) from RNA-seq data of post-mortem brain tissue in Alzheimer's patients and controls.
- Constructed a weighted gene co-expression network using WGCNA (on R) to analyzeHead-Neck Squamous Cell Carcinoma (HNSC) RNA-seq data from TCGA to compare normal and tumor patient data.
- Performed mathematical modeling of network of PhoPQ two component system in *E. coli* using python. Read scientific papers to understand the PhoPQ network in different organism and to find different parameter values to write ODEs for reactions.

Mutational and Trancriptional analysis: HCC | Dr. Abhishek Sinha Oct 2024 – Nov 2024

The project involved experimental and computational biology to study Hepatocellular carcinoma (HCC):
- Investigated the effects of serum concentration and colchicine, a microtubule-disrupting agent, on cell migration and proliferation through scratch assay using HepG2 cell line.
- Conducted a mutational analysis for HCC using the Intogen database. Examined mutation signatures of key genes, identifying prevalent mutation types, affected domains, and their association with HCC progression (driver/passenger).
- Conducted transcriptional analysis using the TCGA database. Using R, I created a volcano plot and heatmap representing differentially expressed genes (DEGs) and top 20 key biomarkers associated with HCC.

Student Consultant for the 'Biology in Space' project | Dr. Saurabh Mahajan Feb 2022 – Mar 2024

In collaboration with the Indian Institute of Space Science and Technology (IIST) and the Indian Institute of Science (IISc)

The main objective of the research project was to propose pilot experiments to conduct experiments in space using freeze-dried microbes. Key objectives include:
- Analyzed the survivability of microbes and biological materials under temperature fluctuations and on various platform surfaces in space.
- Performed experiments to find optimal aeration levels required for efficient microbial growth under space conditions.

Genetically Modified Vitamin B12 Biosensor | Dr. Saurabh Mahajan & Dr. Vihaang Ghalsasi Jan 2024 – Mar 2024

Developed a genetic Vitamin B12 sensor using engineered *E. coli* DH5α by integrating *eutR*, *peutS*, and GFP genes into the PQE60 plasmid to create in-silico and in-vitro models. Applied molecular cloning, transformation, PCR, and RT-qPCR to quantify *eut operon* genes, analyzing the correlation between Vitamin B12 levels and Cq values for *eutS*, *eutM*, *eutD*, and *eutQ* genes.

PUBLICATIONS

SSPACE Astrobiology Payload - 1 (SAP-1)⋆ (Submitted for ASR COSPAR 2023 Special Issue)
ASR COSPAR 2023 | *Elsevier*

The SSPACE Astrobiology Payload (SAP) series, commencing with the SAP-1 initiative, is crafted for the execution of **in-situ microbiology experiments in Low Earth Orbit**. SAP-1 centers around the study of *Bacillus clausii* and *Bacillus coagulans*, evaluating their viability under various space conditions.

COURSES/WORKSHOPS

1. SCIENSPUR Cell Biology Lecture series: Lakshmi Mittal & Family South Asian Institute at Harvard University - FALL 2023: (3 months)

2. 10th Undergraduate Lecture series in Advance Biology - 2023 (NCBS and Instem): (3 months)

3. Python for Data Science, AI & Development by IBM: (1 month)

SEMINARS/EVENTS ATTENDED

Cancer Genomics Symposium 2024 | National Centre for Biological Sciences (NCBS) Sep 2024 – Sep 2024 | Bengaluru, India
Understanding cancer evolution through genomics

Demystifying Vaccines | Bangalore International Centre (BIC) Nov 2023 – Nov 2023 | Bengaluru, India
Evolution of mRNA-Based Platforms in Vaccines and Therapeutics

REFERENCES

Dr. Saurabh Mahajan, *Assistant Professor - Atria University, Bangalore* | *saurabh.mk@gmail.com* | *8050001886*

Dr. Sunil Shetty, *Principal Investigator - ACTREC, Mumbai* | *sunil.shetty@actrec.gov.in* | *8433798721*