Subhadip Jana

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M.Sc. in Biotechnology — Specialized in Antimicrobial Resistance Studies

RESEARCH INTEREST

My research interest lies in exploring the human gut microbiome using metagenomics and bioinformatics approaches. I am particularly interested in understanding microbial diversity, functional gene prediction, and the mechanisms of antibiotic resistance within gut microbial communities. Ultimately, I aim to link microbial functions with human health and disease outcomes.

EDUCATION

University of North Bengal, Darjeeling, West Bengal
M.Sc. in Biotechnology 2022 – 2024
CGPA: 6.29/10

Panskura Banamali College (Autonomous), Purba Medinipur, West Bengal
B.Sc. in Biotechnology 2019 – 2022
CGPA: 8.69/10

Basudevpur Maharaj Nandakumar High School, Purba Medinipur, West Bengal
Higher Secondary 2017 – 2019
Grade: 81%

RESEARCH EXPERIENCE

Dissertation Student - Omics Lab,

University of North Bengal, Supervisor: Dr. Ranadhir Chakraborty Mar 2024 – Jul 2024

Dissertation: *Comprehensive Assessment of Antibiotic Resistance in the Mahananda River: A Study Using Culture-Based and eDNA Metagenomic Methods*

- Conducting a **culture-based** and **eDNA metagenomic study** on antibiotic resistance in the Mahananda River.
- Isolation and identification of resistant strains, including carbapenem-resistant bacteria.
- Performing **DNA extraction**, and **agarose gel electrophoresis**, etc.

- Designed and optimized PCR protocols for the detection of the blaNDM gene in environmental isolates; processed eDNA sequencing data using MetaPhlAn4 to profile resistomes from riverine microbial communities.
- Drafted sections of dissertation and presented findings in departmental seminars, enhancing scientific communication skills.

INTERNSHIP

AI for Omics Research Internship

AI and Biotechnology/Bioinformatics (Remote) July 2025 (continuing)

International Virtual Research Internship Program on Genomics and Bioinformatics (Cancer Genomics)

Genomac Institute Inc. (Remote) June 2025 - August 2025

- Gained hands-on experience in **mapping sequencing reads to reference genomes**, performing **functional annotation**, and conducting **variant calling** during internship training.
- Performed **codon identification, sequence translation, ORF prediction, and primer design** to support accurate gene characterization and downstream molecular biology applications.

Summer Research Internship in Bioinformatics and Microbial Genomics

BioPractify (Remote) June 2025 - July 2025

- Conducted Illumina sequencing data analysis: performed quality control using FastQC, cut adapter with Cutadapt, and performed genome assembly.
- Executed a prokaryotic genome annotation using Prokka, identifying gene features and 16S rRNA copy numbers across multiple bacterial genomes.
- BLAST-based genus-level classification performed using **16S sequences**; generated **taxonomic profiles** for eight bacterial isolates.
- Applied the **Mann–Whitney U** test to assess 16S rRNA copy number differences between bacterial groups; visualized results with plots.

PROJECTS

Metagenomics-Based Antibiotic Resistance Gene Profiling(Independent Project)

GitHub Repository: github.com/SubhadipJana1409/metagenomics-arg-pipeline July 2025

- Developed a reproducible command-line pipeline for profiling antibiotic resistance genes (ARGs) from metagenomic sequencing data.

- Integrated quality control (FastQC, Trimmomatic), **taxonomic profiling** (Kraken2), and ARG annotation (**RGI – Resistance Gene Identifier**).
- Designed modular Jupyter notebooks for each analysis step, ensuring interpretability, scalability, and educational transparency.

Tools/Skills: Python · Bash · Git · Conda · Bioinformatics · Metagenomics · RGI · Kraken2 · Shell scripting · Jupyter Notebooks

Genome Assembly & Annotation of *E. coli* (Independent Project)

GitHub Repository July 2025

- Performed quality check (FastQC), trimming (Cutadapt), and genome assembly (SPAdes)
- Annotated genomes (Prokka), identified 16S rRNA copies & representative genera (via BLAST)
- Compared genome sizes & gene copy numbers between bacterial groups; statistical analysis using Mann–Whitney U test

Tools/Skills: FastQC, Cutadapt, SPAdes, Prokka, BLAST, genome annotation, 16S rRNA analysis, taxonomic classification, statistical testing (Mann–Whitney U).

Project Assistant – Karry Mullis Molecular Biology Lab, Panskura Banamali College.

Project: In vitro phytochemical analysis and antihelmintic activity of Acacia nilotica June 2019 - August 2019

- Conducted a comparative study on the **anthelmintic effects** of *Acacia nilotica* extracts; observed 60% higher efficacy versus control (Albendazole).
- Compared extract efficacy with standard drug Albendazole.
- Conducted **phytochemical screening** of Acacia nilotica.

ACADEMIC PROJECTS

Screening Soil Isolates for Antibiotic Production Against MDR Strains (Course-based Mini-Review Project)

University of North Bengal 2023

- Isolated actinomycetes from soil samples and screened them for antibacterial activity using **agar diffusion assays**.
- Identified bioactive isolates via Gram staining.
- Assessed efficacy against lab strains of E. coli, S. aureus, and P. aeruginosa.
- Presented an academic seminar.

Plasmid-Mediated AMR in Environmental E. coli Isolates from Hospital Wastewater (Course-based Mini-Review Project)

University of North Bengal 2023

- Collected and cultured wastewater samples to isolate E. coli.
- Performed **plasmid isolation**, restriction digestion, and antibiotic susceptibility testing (Kirby-Bauer method).
- Discussed potential links between hospital effluent and community-acquired AMR.

Antimicrobial Properties of Medicinal Plant Extracts Against ESBL-Producing Bacteria (Course-based Mini-Review Project)

University of North Bengal 2023

- Collected traditional medicinal plants and prepared ethanolic extracts.
- Tested antibacterial activity against **extended-spectrum beta-lactamase (ESBL)**-producing E. coli and Klebsiella using MIC and disk diffusion assays.
- Evaluated synergistic effects with commercial antibiotics

PROFESSIONAL EXPERIENCE

Field and Community Engagement

Agricultural Input Retail Associate – Family-Run Fertilizer Shop, Self-Employed Mar 2019 - Nov 2022

Tamluk, India (Part-time / Seasonal Support) Aug 2024 - Present

- Supported operations of a rural agricultural input shop serving small and marginal farmers in West Bengal.
- Interacted regularly with farmers across **cropping cycles**, gaining grassroots insights into fertilizer use, pest management, and input-driven decision-making.
- Observed the effects of government subsidy schemes, seasonal trends, and market fluctuations on farmer purchasing behavior.
- Noticed emerging interest among farmers in **natural farming** inputs such as neem-based pesticides, compost, and low-cost indigenous solutions.
- Facilitated informal discussions with farmers about sustainable alternatives, soil health, and long-term productivity concerns.

Subject Matter Expert

Course Hero Aug 2024 - Present

- Provide academic assistance in biotechnology and life sciences subjects.
- Create high-quality, accurate explanations and solutions.

Data Analytics (Remote Internship)

Forage Jun 2020 - Jul 2020

- Analyzed and cleaned datasets using Microsoft Excel for actionable insights.
- Applied formulas and **pivot tables** for data summarization.
- Created charts and dashboards for visual reporting and trend analysis.
- Automated tasks using macros to streamline data workflows.

TECHNICAL SKILLS

- Bioinformatics: Metagenomic analysis (**MetaPhlAn4, KBase**), **taxonomy profiling**, and antibiotic resistance gene (ARG) detection, **FastQC, Cutadapt, Prokka, BLAST, Genome Assembly, Linux CLI, Genome Annotation, 16S rRNA Analysis**.
- **Microbiological Techniques**: Culture-dependent methods (serial dilutions, direct plating, enrichment cultures), isolation of antibiotic-resistant bacteria (carbapenem-resistant, benzylpenicillin-resistant), and phenotypic characterization (Gram staining, catalase, oxidase, indole production, citrate utilization).
- Antibiotic Susceptibility Testing: **Disk diffusion method**, interpretation of zones of inhibition, and resistance profiling of antibiotics.
- Molecular Biology: **Metagenomic DNA extraction**, agarose gel electrophoresis, PCR, next-generation sequencing.
- Analytical Techniques: **EDTA assay** for metallo--lactamase (MBL) detection, biochemical profiling

Soft Skills: MS Word, MS Excel, MS PowerPoint, Scientific Writing, Literature Review, Seminar Presentation, Project Proposal.

SCHOLARSHIPS & AWARDS

- Swami Vivekananda Merit-cum-Means Scholarship — Postgraduate Level (2023–2024)
- Swami Vivekananda Merit-cum-Means Scholarship — Undergraduate Level (2019–2022)
- Swami Vivekananda Merit-cum-Means Scholarship — Higher Secondary Level (2017–2019)

VOLUNTEERING

Global Outreach - Student Member , American Society for Microbiology , Aug 2024 - Present

- Engaged in international scientific networking and knowledge-sharing through ASM Connect and webinars.

- Assisted in organizing **microbiology awareness activities** in academic and local community settings.
- Promoted antimicrobial resistance (AMR) awareness through digital campaigns aligned with WHO's AMR Week.
- Contributed to an ASM-supported public health initiative aimed at increasing awareness of **antibiotic stewardship** and resistance mechanisms in India.

RELEVANT COURSES

Genomics and Bio-informatics, Bioenergetics of Life Processes, R programming, Bacterial Genomes II: Accessing and Analysing Microbial Genome Data with Artemis, Microbial Genetics.

REFERENCES

Dr. Ranadhir Chakraborty
Professor, Department of Biotechnology, University of North Bengal
Email: rcnbusiliguri@gmail.com

Dr. Anoop Kumar (Ph.D.)
Assistant Professor (Stage 2), Department of Biotechnology, University of North Bengal
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Dr. Manab Deb Adhikari (Ph.D.)
Assistant Professor, Department of Biotechnology, University of North Bengal
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