BANDANA KUMARI PANDIA

Ph.D.
Division of Biological Sciences
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EDUCATION

- **Indian Institute of Science, Bengaluru, India** *August 2016 - October 2024*
  Integrated PhD: M.Sc and Ph.D. CGPA: 7.2
  - Title: **Deciphering hypoxic adaptations in *Cutibacterium acnes* using multi-omics profiling and systems modelling**

- **Regional Institute of Education, Bhubaneshwar, India** *2015*
  Integrated BSc BEd, Odisha, India Percentage: 76 %
- **Kendriya Vidyalaya, Balasore, India** *2011*
  Central Board of Secondary Education, Odisha, India Percentage: 86 %

ACADEMIC APPOINTMENTS

- **Molecular Biophysics Unit** *November 2025 - Present*
  Research Associate IISc, Bengaluru, India
  - Applying Network Similarity Scores (NSS) which is an in-house methodology for quantifying protein structural similarity for the G-protein coupled receptor (GPCR) structures predicted by Alphafold3.

- **Department of Biochemistry** *April 2025 - October 2025*
  Project Associate IISc, Bengaluru, India
  - Worked on the backend development of the CAcnesDB.

TEACHING EXPERIENCE AND COLLABORATIONS

- **Department of Biochemistry** *August - December 2019*
  ***Teaching Assistant**: Protein Structure and Function* IISc, Bengaluru, India
- **Hindustan Unilever Research Center** *October 2018 - August 2019*
  Collaborator Bengaluru, India
  - Phenotypic microarray profiling for the growth of *Staphylococcus epidermidis*.
  - It is a high-throughput technology for studying the growth phenotype of cells on multiple substrates and under different antibiotic concentrations.

- **Kendriya Vidyalaya** *February 2015*
  Teaching intern Bhubaneshwar, India
  - Taught class-7 for a period of 1-month in the subject of Science.
  - Gained experience for teaching skills as a primary and secondary school teacher.

PhD Thesis

- **Project *CAcnesDB***
  In collaboration, Role: Researcher and Lead Developer
  - Tools & technologies used: R, Linux, Bash
  - Complete Genomics database of all the proteins associated with the *Cutibacterium acnes* that encompasses protein structures, small-molecule binding pockets, ligands having binding capacity to the corresponding pockets, multiple aspects of annotation, etc.
  - Modeled structures using Alphafold2 for the entire *C. acnes*' proteome, identification of pockets (*C. acnes*' pocketome), and identification of the small-molecule ligands that can bind to these pockets, constituting the *C. acnes* predicted metabolome (CApM).

- **Transcriptome study of *Cutibacterium acnes* in anaerobic versus aerobic conditions**
  Experimentalist and Researcher
  - Tools & technologies used: BSL-2, RNA isolation kits
  - *C. acnes* is a skin anaerobe and an opportunistic pathogen under different physiological conditions.
  - Growth phenotype of *C. acnes* grown in anaerobic (hypoxia) and aerobic conditions (normoxia).
  - mRNA isolation from the exponential phase of the bacteria, followed by RNAseq analysis.
  - Transcriptome data integrated systems-wide analysis to identify the genome-wide alterations in *C. acnes* in hypoxia.

- **Genome-Wide Metabolic Adjustments In *C. acnes* KPA171202 In Low Potassium Conditions**
  Researcher
  - Tools & technologies used: Matlab, CobraToolBox
  - Construction of a genome-scale metabolic model (GSM) of *C. acnes.*

- **Metabolic reprogramming in *C. acnes***
  Researcher
  - Tools & technologies used: Matlab, CobraToolBox, Memote
  - Transcriptome data integrated with the genome-scale metabolic model of *C. acnes* to trace the flow of carbon-flux in *C. acnes*' metabolic pathways in hypoxia.

MANUSCRIPTS

- ***CAcnesDB*: A database of *Cutibacterium acnes* with Integrated Functional Insights derived from Multi-modal Genome Annotation** *Communicated*
  Bandana Pandia, Dheemanth Regati, Nihesh Rathod, Santhosh Sankar, Sneha Vasudevan, R. Sowdhamini, Nagasuma Chandra

- **A Systems view of Alterations and metabolic reprogramming in Hypoxia in *Cutibacterium acnes*** *Under preparation*
  Bandana Pandia, Anmol Singh, Sukriti Pal, Dipshikha Chakravortty, Nagasuma Chandra

CONFERENCES

- **Cell Symposia** *June 2023*
  Genome-Wide Metabolic Adjustments In Cutibacterium acnes KPA171202 In Low Potassium Conditions Poster

TECHNICAL SKILLS AND INTERESTS

Area of Expertise: Computational biology, Systems biology, Structural bioinformatics, Anaerobic metabolism, Hypoxia

Languages: R, Python, Shell scripting

Expertise: In-vitro culturing of anaerobes, Isolation of mRNA for RNAsequencing, Genome-Scale metabolic model reconstruction, Omics-integrated GSM simulation, Systems modeling, High Throughput Data (Phenotypic microarray, RNAseq data) analysis, Human- and microbe- transcriptome analysis, Data cleaning, Phenotypic profiling, Systematic Annotation

Developer Tools: UNIX commands, MATLAB, LaTeX, VS Code

Frameworks: Cytoscape, ColabFold, AlphaFold2, Autodock, BLAST

Cloud/Databases: RCSB-PDB, NCBI, EMBL, UniProt, KEGG

Soft Skills: Collaboration, Flexibility, Mentoring, Time management, Patience, Persistence

Coursework: General Biochemistry, Essentials in Microbiology, Mathematics and Statistics for Biologists, Biophysics, Bioengineering, Current Trends in Drug Discovery, Protein Structure and Function

ACHIEVEMENTS

- **All India Rank - 34** Biotechnology *JAM 2016*
- **All India Rank - 91** Biological Sciences *JAM 2016*

LANGUAGES

English (fluent), Hindi (native), Odiya (native)

REFERENCES

- **Prof. Nagasuma Chandra** — *Department of Biochemistry*
  nchandra@iisc.ac.in — IISc, Bangalore.
- **Prof. Dipshikha Chakravortty** — *Department of Microbiology and Cell Biology*
  dipa@iisc.ac.in — IISc, Bangalore.
- **Prof. Sandeep M. Eswarappa** — *Department of Biochemistry*
  sandeep@iisc.ac.in — IISc, Bangalore.
- **Prof. Kesavardana Sannula** — *Department of Biochemistry*
  skesav@iisc.ac.in — IISc, Bangalore.
- **Dr. Nihesh Rathod** — *Bangalore, India.*
  nihesh.rathod@strandls.com — Strand Life Sciences
- **Prof. R Sowdhamini** — *Bangalore, India*
  mini@ncbs.res.in — National Centre for Biological Sciences