

## Anjali Kumari Singh

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### Educational qualifications

Degree	College/ School/ University/ Board	Year of passing	Marks
Integrated MS-Ph.D.	Indian Institute of Science Education and Research (IISER) Tirupati, India	2025	9.4/10 CGPA
B.Sc. (Honours)	Asutosh College, Calcutta University, West Bengal, India	2018	69.5%
Class 12	Carmel School, Kolkata, West Bengal, India; ISC	2015	91.8%
Class 10	Carmel School, Kolkata, West Bengal, India; ICSE	2013	95.5%

### Research experience

- **Ph.D. scholar** [August 2020 – July 2025] Indian Institute of Science Education and Research (IISER) Tirupati

*Advisor: Dr. Sreenivas Chavali*

**Thesis title:** Context-dependent roles of amino acid repeats in proteins

I have investigated the roles of single amino acid repeats (homorepeats) in human proteins in influencing organismal fitness, their co-occurrences in protein functionality and their involvement in host-pathogen interactions. I have assembled the human essentialome and using publicly available large-scale datasets, investigated the role of human proteins with homorepeats in them. By generating novel mathematical metrics, I have worked on understanding the mode of action of human dissimilar homorepeat containing proteins on protein functionality. By assembling and analysing human-pathogen protein-interaction dataset I have worked on delineating the mechanism of engagement of homorepeat containing proteins in human-pathogen protein interactions.

## Skillsets

### *Computational biology*

I am experienced in assembling and analysing large-scale biological datasets, spanning sequence, structure, function, interaction, regulation, phenotype and evolutionary analysis. I have used different network topological measures including network randomization and network dismantling to analyse complex functional and regulatory biological networks. I have integrated mRNA expression data (scRNA sequencing and differentially expressed genes) on functional and regulatory networks to understand biological information. I have a good understanding of different statistical measures and how to use them to understand biological information. I am proficient in R programming language.

### *Experimental biology*

I have trained myself in performing molecular biology experiments, including cloning, generating mutants and protein biochemistry-based studies. I have also worked on parasite culturing using *Plasmodium falciparum* and generating mutant parasite lines using CRISPR-Cas9 system.

### *Scientific communication*

I periodically mentor the research projects of two Ph.D. students in the lab.

I have done day-to-day supervision of and trained four semester project students and two master thesis students.

I have a four year experience in teaching and communicating with students at different stages of their career (Bachelors' and Masters' students), as a part of my PMRF (Prime Minister's Research Fellowship; <https://www.pmr.in/>) deliverables, designing and teaching courses spanning omics, bioinformatics, biostatistics, phylogenetics and molecular biology.

## Publications

### *In submission/ under review*

1. **Singh AK**, Babu A, Kappagantula SK, Ganguli S, Harikrishnan R, Borkar T, Sharma V, Dhayalan A, Chavali PL, Chavali S. Functional landscape of co-occurring amino acid repeats in proteins. **Manuscript in submission.**
2. **Singh AK**, Rachote N, Agrawal A, Sharma V, Kappagantula KS, Kadumuri RV, Chavali S. Amino acid repeat signatures underlying human-pathogen interactions. **Under revision in iScience.** Available on bioRxiv: <https://doi.org/10.1101/2025.03.17.643713>.

### *Published*

3. **Singh AK**, Amar I, Ramadasan H, Kappagantula KS, Chavali S. Proteins with amino acid repeats constitute rapidly evolvable and human-specific essentialome. **Cell Reports** 2023; 42: 112811.
4. Chavali PL, **Singh AK**, Chavali S. Nuclear architecture and transcriptional regulation of microRNAs in MicroRNA in Regenerative Medicine, Second Edition (Ed: Chandan Sen), **Elsevier Academic Press** 2023.
5. Chutani N, **Singh AK**, Kadumuri RV, Pakala SB, Chavali S. Structural and functional attributes of Microrchidia family of chromatin remodelers. **Journal of Molecular Biology** 2022, 434: 167664.
6. Gupta S, Kadumuri RV, **Singh AK**, Chavali S, Dhayalan A. Structure, activity and function of the protein arginine methyltransferase 6. **Life** 2021; 11: 951.
7. Chavali S, **Singh AK**, Balaji S, Babu MM. Amino acid homorepeats in proteins. **Nature Reviews Chemistry** 2020; 4: 420-434. Cover image; August 2020, vol. 4, no. 8.

## Fellowships received/ qualified for

- Prime Minister's Research Fellowship (PMRF) to undertake Ph.D. studies (2020-2024)
- Proficiency award at IISER Tirupati for academic excellence in Integrated Ph.D. (2 years MS program) in Department of Biology (2018-2020)
- Qualified for Council of Scientific and Industrial Research-Junior Research Fellow (CSIR-JRF), with all India rank 11<sup>th</sup> (2019); Did not avail

- Indian Institute of Science Education and Research (IISER) Tirupati Fellowship for Integrated Ph.D. program (2018-2024)
- 25<sup>th</sup> rank in IIT Joint Admission Test for M.Sc. (JAM)– Biological Sciences, and 104<sup>th</sup> rank in IIT JAM– Biotechnology (2018)
- 40<sup>th</sup> rank in JNU Combined Entrance Examination for Biotechnology (CEEBS; 2018)
- Qualified JGEEBILS (2018)

### **Workshops/ Conferences attended**

- Participated and presented poster in the “Quantitative biology to molecular mechanisms” conference held at European Molecular Biology Laboratory (EMBL) Heidelberg, Germany (2024)
- Received the best poster award at “Biology Day 2024” held at Indian Institute of Science Education and Research (IISER) Tirupati, India (2024)
- Participated and presented poster in the “Macromolecular Assemblies: Structure, Function, and Evolution” conference held at Indian Institute of Science Education and Research (IISER) Pune, India (2023)
- Attended workshop on Integrative Modelling using IMP held at Indian Institute of Science Education and Research (IISER) Pune, India (2023)
- Presented poster as a part of “Highlighted poster” in The Prime Minister’s Research Fellows Annual Symposium held at Indian Institute of Technology (IIT) Madras, India (2023)
- Two week short term online course on “Biostatistics: A User’s Perspective” organised by Indian Institute of Science Education and Research (IISER) Pune, India (2022)
- Two day online symposium on PDB, “2021 ASBMB Protein Data Bank Symposium - 50th year celebration”, organised by American Society for Biochemistry and Molecular Biology (2021)
- Five day workshop on Artificial Intelligence and Machine Learning, held at Indian Institute of Technology (IIT) Tirupati, India (2019)
- Five day workshop on Data Analysis and Machine Learning, held at Indian Institute of Science Education and Research (IISER) Tirupati, India (2019)

**Personal information**

Nationality: Indian

Date of Birth: 30-01-1998

Languages known: English, Hindi, Bengali

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