Dhanasekhar V.K.

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Education

▸ **Integrated BS-MS in Biological Science**　　　　　　　　　　　　　2018–2023
  - ▹ Indian Institute of Science Education and Research (IISER) Mohali, India
  - ▹ Majors: Biological Science | Minors: Data Science

Research Interests

- ▸ Algorithmic biology & theoretical analysis
- ▸ Predictive modelling & pattern recognition in biological data
- ▸ Evolutionary modelling in cancer & viral infections
- ▸ Human gut microbiome in health & disease
- ▸ Gene regulatory network analysis
- ▸ Dynamic system modelling
- ▸ Genotype-phenotype mapping
- ▸ Disease biology through bioinformatics & systems biology
- ▸ Precision medicine & therapeutic development

Research Experience

▸ **Research Intern, IBAB, Bengaluru**　　　　　　　　　　　　Feb 2024–Present
  - ▹ **Title:** Multivariate Mutual Information (MMI) based prediction of histone Post Transcriptional - Modifications (PTMs)
  - ▹ **Supervisors:** Dr. Nithya Ramakrishnan (IBAB), Dr. Sibi Raj B Pillai (IIT Bombay)
  - ▹ Implemented MMI-based feature histone selection methodology to predict target histone PTMs
  - ▹ Developed graph entropy-based clustering algorithms to cluster similar histone PTMs
  - ▹ Employed machine learning and neural network models for histone PTM predictions

▸ **Research Intern, IISER Mohali**　　　　　　　　　　　　Jul 2023– Oct 2023
  - ▹ **Title:** Computational Framework for Single Residue Mutated Proteins
  - ▹ **Supervisor:** Dr. Shashi Bhushan Pandit (IISER Mohali)
  - ▹ Built a website framework that visualizes protein structural changes using protein contact network properties for given UniProt IDs

▸ **Thesis Project, IISER Mohali**　　　　　　　　　　　　Aug 2022–May 2023
  - ▹ **Title:** Protein Residue Contact Network Analysis to Understand Phenotypic Effects of Single Residue Mutations (SRMs)
  - ▹ **Supervisors:** Dr. Shashi Bhushan Pandit (IISER Mohali), Prof. Somdatta Sinha (IISER Kolkata)
  - ▹ Developed comprehensive scoring matrix using network science for protein contact network construction and statistical methodologies to investigate phenotypic effects of SRMs across $3,600$ wild-type and mutant protein pairs
  - ▹ Investigated correlation of physio-chemical properties, structure, and phenotypic effects using Deep Mutational Scanning (DMS) dataset containing $2,004$ SRMs

▸ **Research Intern, IISER Mohali**　　　　　　　　　　　　Jul 2022–Aug 2022
  - ▹ **Title:** Study the Variation of Different Types of Contacts in Single Domain Proteins
  - ▹ **Supervisor:** Dr. Shashi Bhushan Pandit (IISER Mohali)
  - ▹ Analyzed long-range contact variations and structural stability in proteins using graph theory

▹ Quantified percentage of contact variations in single domain protein dataset from CATH Database

Poster Presentation

▸ **Thesis Poster:** Protein Residue Contact Network Analysis to Understand Phenotypic Effect of Single Residue Mutations   2023
  ▹ Presented at IISER Mohali, India

Skills

▸ **Computational & Data Analysis:**
  ▹ Programming: Python, R, C++
  ▹ Machine learning & neural networks
  ▹ GPU, HPC & parallel programming

▸ **Software & Tools:**
  ▹ Linux & shell scripting
  ▹ Version control: Git
  ▹ Web development: Flask, Django, HTML, CSS
  ▹ Databases: MySQL, MongoDB
  ▹ Bioinformatics databases & repositories
  ▹ Scientific writing: LaTeX & Zotero

▸ **Mathematics & Modeling:**
  ▹ Linear algebra, probability, statistics
  ▹ Information theory, graph theory
  ▹ Network science in biological systems

▸ **Biological Knowledge:**
  ▹ Molecular biology
  ▹ Genomics & proteomics
  ▹ Structural biology

▸ **Wet Lab Techniques:**
  ▹ PCR, gel electrophoresis
  ▹ Plasmid cloning, DNA isolation

References

▸ **Dr. Nithya Ramakrishnan**
  ▹ Assistant Professor, IBAB Bengaluru
  ▹ ✉ nithya@ibab.ac.in

▸ **Dr. Shashi Bhushan Pandit**
  ▹ Associate Professor, IISER Mohali
  ▹ ✉ shashibp@iisermohali.ac.in

▸ **Prof. Somdatta Sinha**
  ▹ INSA Senior Scientist, IISER Kolkata
  ▹ ✉ ssinha@iisermohali.ac.in

▸ **Paras Verma**
  ▹ PhD Candidate, IISER Mohali
  ▹ ✉ ph17060@iisermohali.ac.in