Tejas Rao | *Aspiring Researcher*

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Education

Krea University, B.Sc in Biological Sciences and Data Science — Apr 2023 – May 2027

- Grade: Junior (3rd Year) | GPA: **9.75**/10 (On Dean's List since Freshman year)
- **Relevant Coursework:** *Data Science:* Applied Statistics, Python for Data Science, Introduction to Statistical Learning, Responsible AI, Applied Dynamical Systems, Data Analytics, Data Structures and Algorithms, Geometry for Computer Vision, Linear Algebra, Introduction to Calculus, Discrete Mathematics
  Biological Sciences: Biostatistics (R), Biochemistry, Microbial Genomics, Genetics & Advanced Cell Biology Lab, Anatomy & Physiology, Physics for Chemists and Biologists, Evolution, Ecology & Conservation Biology

Digital SAT: Score of **1500**/1600 (98^{th} Percentile) — May 2023

- Mathematics Section: **800**/800 (99^{th} Percentile) | Reading Section: **700**/800 (93^{rd} Percentile)

Grade 12 (CBSE - Sciences), NPS Agara: Grade of **96.87%** (99^{th} Percentile) — May 2023

Publications

Investigating Health Literacy and Sociodemographic Factors in College Students — Jul 2025
Shyam Kumar Sudhakar, Divij Doshi, Gayatri Nair, ***Tejas Rao*** | *Scientific Reports (Nature Portfolio)*

Interpretable Deep Learning Predicts Polycythemia Vera and Identifies Novel Genomic Associations
Tejas Rao†, Chepsy C. Philip, Bani Jolly, Aakash Chozakade, Minu Luckose, Bobby George, Sudhir Venkatesh, Bonnie George, Anupa Jacob, Vinod Scaria | *Accepted to American Society of Haematology's 2025 Annual Meeting (†: Presenting Author)*

Depolarization Block Susceptibility of Inhibitory Fast-Spiking Neurons: Biophysical Mechanisms that can Contribute to Seizure Initiation and Propagation
Shyam Kumar Sudhakar, ***Tejas Rao***, Omar J Ahmed | *In Preparation, to be submitted to Epilepsia (IF: 6.6)*

From N- to O-Glycoproteomics: Revisiting Astral Narrow-Window DIA Data for O-Glycopeptide Discovery
Kathirvel Alagesan*, ***Tejas Rao**** | *In Preparation (∗: Equal Contribution)*

Investigating the Association Between Skin Health and Stress in University Students
Shyam Kumar Sudhakar, ***Tejas Rao***, Sunita Makhijani, Gautam Bannerjee | *In preparation (Journal Submission)*

Experience

Bioinformatics Intern, Karkinos Healthcare — Jun 2025 – Present

- Collaborating with the AI/ML and Bioinformatics teams to derive differences within Whole Exome Sequencing data between healthy individuals and cancer patients.
- Developed a novel, explainable deep learning methodology that can predict the presence of polygenic malignancies (like Polycythemia Vera) with high fidelity. The method additionally ascribes gene-level importance, which resulted in recovering known and identifying novel genomic associations. Findings accepted to ASH 2025, and will be published in a peer-reviewed journal.

Research Collaborator, Max Planck Unit for the Science of Pathogens – Remote — Apr 2025 – Present

- Working with the Proteomics Research Platform (incubated in Charpentier Lab, Nobel – 2020), under Dr. Kathirvel Alagesan.
- Conducting research to evaluate quantitative, bottom-up mass spectroscopy methods to profile the O-Glycoproteome. Responsibilities include data analysis & visualisation, ideation and manuscript writing.

Work-Study Student, Krea University — Jan 2025 – Apr 2025

- Authoring a manuscript with Prof. Sudhakar & Prof. Omar Ahmed (UMichigan Ann-Arbor) delineating the bio-mechanistic factors contributing to the susceptibility of FS neurons experiencing epileptic cell-states.
- Participated in data analysis & visualisation on data generated by biophysically-accurate in-silico neuron models.
- Conducted exploratory analysis & hypothesis tests on a pilot study to identify biological, neurological, and sociodemographic determinants of Mental Health.

Teaching Assistant, Krea University Jan 2025 – May 2025

- Served as a TA for the Python for Data Science course (DATA201), with a class size of 110+ students.
- Conducted tutorials, formulated course material, and performed evaluation & administrative duties.

Research Intern and Trainee, Indian Institute of Technology, Delhi Apr 2024 – May 2025

- Conducted a detailed literature review on Deep Learning and Quantum ML in Drug Discovery, surveying advances from 120+ publications.
- Independently researched Quantum ML models (QGANs & VQE) for small-molecule generation, particularly on how to reduce the likelihood of 'modal collapse' in QGANs through training techniques.
- Completed a rigorous one-month certification on Quantum Computing & ML (IIT-D: QCML).

Projects

Deep Learning on EEG Data for Haemoglobin level classification Jul 2025 – Present

- Working under Prof. Shyam Sudhakar to use graph networks and other deep learning architectures to classify haemoglobin levels using tensorised representations of EEG data. The effort is based on novel correlations found between some dimensions of EEG and haemoglobin in an Indian cohort.

Research on the Differential Effect of Gap Junctions on Depolarisation Block Jan 2025 – May 2025

- In networks of neurons, Gap Junctions have previously been shown to both promote & prevent the propagation of the Depolarisation Block, an Epileptic cell state. Collaborated with Prof. Shyam Sudhakar to probe for the network-specific parameters explaining this differential effect on the propagation via in-silico methods. Project in development, awaiting grant funding (anticipated continuation in October 2025).

Conversational RAG Chatbot for University Syllabus Queries Oct 2024 – Jan 2025

- Requirements gathering (Functional and Non-Functional)
- Designed and developed a Retrieval-Augmented Generation (RAG) Chatbot, in collaboration with a team of 3 other students, to support students with curriculum-related inquiries, enhancing educational accessibility.
- Led deployment on AWS Cloud after conducting stress-tests to ensure scalability & stability of the platform.

Skillset

Technical:

- *Python & R*: EDA (Numpy, Pandas, Scipy), Visualisation (Matplotlib, Seaborn, ggplot), ML (Sklearn, Pytorch), LLMs (Langchain, LangGraph, Prompt Engineering, RAG)
- *HPC Workflows*: Command Line, Job Scheduling (PBS), Bash Scripting, VCF Handling, Git, AWS, Docker
- *Biology-Specific*: NEURON (hoc), RDKit, Phylogenetic Tree Construction, Sequence Alignments, Genome Assembly, AlphaFold, Genomics, Glycoproteomics
- *Wet Lab*: Culture preparation (Microbial and Drosophila), Plating, Simple Microscopy (Oil-immersion, Stereo), Buffer and Reagent preparation, Plasmid Isolation, Electrophoresis (DNA & SDS-PAGE), qPCR, Drosophila genetics, Differential Staining (Giemsa, Gram)
- *Other*: Streamlit, Hypothesis Testing, Academic Writing, LATEX

Other:

- *Web Development*: Website design and layout, UI/UX design, content optimisation, SEO, Wix
- *Content Creation*: DaVinci Resolve, Photoshop, Lightroom, Ableton Live, Audacity, Photography

Extracurricular

- Volunteered for the safe rescue and release of over **100** snakes, collaborating closely with the local community. Responded to sightings, identified snake species, and organised rescue operations to ensure safe relocation.
- Volunteered at 'Soil and Soul': a social enterprise offering eco-friendly alternatives to chemical-based products. Played a pivotal role in designing and developing 2 websites, including an E-commerce website.
- Interned at BioEnzyme Entrepreneur's Academy – a women-run non-profit organisation promoting the effective addressing of environmental issues by educating communities and training 'Eco-Entreprenuers'. Played a crucial role in building the website & produced a range of multimedia content (articles, animated videos, banners).
- Raised funds to feed nearly **250** underprivileged children for one year (Mid-Day Meals Scheme, Akshaya Patra).