

EDUCATION

- **Birla Institute of Technology and Science** Pilani, India
Integrated B.Engg. Computer Science and M.Sc. Biological Science; GPA: 8.84/10 *Aug. 2017 – May. 2022*
- **Hislop Junior College** Nagpur, India
Class XII, (Electronics); Percentage: 90.44% (top 1 percentile) *Jun. 2015 – May 2017*

PROGRAMMING SKILLS

- **Languages:** C, Python, Java, MATLAB, Verilog, LaTeX
- **Libraries and Software Skills:** PyTorch, Keras, MS SQL, scikit-learn, NumPy, Matplotlib, pandas

PUBLICATIONS

- **Rawal, I.,** Sethuraman, A., Assessing linked selection and long-distance association of functional mutations in SARS-CoV-2 variants in India. Poster presented at COVID-19 Dynamics and Evolution Virtual Conference, organised by UCSD CME; 2020 Sep 19-20

WORK EXPERIENCE

- **Neural Dynamics of Visual Cognition Group, Freie University Berlin** Berlin, Germany
Guest Scientist *Dec. 2020 – Present*
 - Working with Prof. Radoslaw Martin Cichy and Prof. Gemma Roig (CVAI Lab, Goethe University) to decode and reconstruct the features of natural videos from brain fMRI signals using Deep Learning.
 - Using Deep Neural Network activations as a proxy to map the fMRI features to the video space to decode, understand and compare the hierarchical and selective representation of features in the brain and neural network using **activation maximization**.
 - Designing a temporally consistent **natural prior** for **feature inversion**.
- **Advanced Data Analytics and Parallel Technologies Lab, BITS Pilani** Pilani, India
Research Assistant *Jan. 2021 – Present*
 - Working under the guidance of Prof. Poonam Goyal to build a distributed and parallelizable de-novo genome sequencer using greedy-like approach.
 - Developing an efficient solution for contig generation problem, modelled as a **string reconstruction** problem, by designing unitigs and other statistically relevant features for the merge phase.
 - Designing a heuristic of **Smith-Waterman algorithm** to generate a consensus matrix for contig generation.
- **Laboratory for Orthopaedic Biomechanics, ETH Zürich** Zürich, Switzerland
Remote Project Assistant *May 2020 - Jul 2020*
 - Constructed a Deep Learning model for segmenting intervertebral discs from MRI scans of the spinal cord.
 - Implemented and compared the architectural variants of **U-Net** (viz. vanilla, skip connections, inception) on the basis of IoU and accuracy scores.
 - Achieved the state of the art dice score of **94.1%** using skip connections and inception modules in the architecture and a weighted combination of MSE and dice loss for optimization. The work has been submitted to Journal of Orthopaedic Research in April 2021

PROJECTS

- **Computational modelling of gene regulatory networks using formal methods**
Supervisor: Prof. Rajesh Kumar, BITS Pilani *Aug 2020 - Dec 2020*
 - Implemented a Boolean model of stochastic gene regulatory network using context-sensitive Probabilistic Boolean Networks (**cs-PBN**) to identify stable attractor cycles on ASSA-PBN.
 - Proved Stochasticity in Nodes and Stochasticity in Function models as special cases of cs-PBN.
- **Optimizing structure of novel heavy metal complexes for cancer detection**
Supervisor: Prof. Shibasish Chowdhury, BITS Pilani *Aug 2020 - Dec 2020*
 - Identified a set of candidate cancer biomarkers with unique hydrophobic pockets compatible with the in-house developed novel aggregation induced emission complexes
 - Conducted **molecular docking** studies to find the docking sites and hence to predict ligand aggregation which drove the experimental framework for the future course of the project
- **Analysis of long-distance linked selection in Indian variants of SARS-CoV-2**
Supervisor: Prof. Arun Sethuraman, Sethuraman Lab, CSU San Marcos *Jun 2020 - Sept 2020*
 - Analyzed over 1,200 sequences of SARS-CoV-2 sequences from India amidst the COVID-19 pandemic.
 - Mined and identified 14 significant non-synonymous mutations and conducted homology modelling-based analysis to understand their downstream effects.
 - Re-purposed **apriori algorithm** to understand the long-distance association of mutations in SARS-CoV-2.

AWARDS AND SCHOLARSHIPS

- Received young investigator scholarship for attending and presenting poster at the COVID-19 Dynamics and Evolution Virtual Conference, organised by **UC San Diego School of Medicine**
- Recipient of INSPIRE- Scholarship of Higher Education (**INSPIRE-SHE**), Department of Science and Technology, Govt of India, for meritorious performance and pursuing research in life sciences.

EXTRA CURRICULAR

- **Students' Academic Cell, BITS Pilani**
Senior Member *Aug 2018 - Present*
 - Impacted over 500 students via mentorship and open house sessions, under the guidance of the Director, BITS Pilani to enhance the research and the academic environment.
 - Conducted placement talks and gyaan sessions to expose the students to various available opportunities.
- **BITS Embryo**
Secretary *Aug 2017 - May 2020*
 - Worked to augment the academic culture by extending the bounds beyond textbooks and classrooms.
 - Organized over 30 live and virtual talks on topics ranging from journalism to science and technology
 - Organized technical competitions in collaboration with industrial partners like GE Healthcare, Zulip receiving a participation of 50+ teams per year.
- **National Service Scheme, BITS Pilani**
Core Team Member, Project Umang *Aug 2017 - May 2019*
 - Worked to improve the reach and quality of education for underprivileged kids of Pilani village.
 - Raised INR 1.7 million for scholarships of needy students through week-long crowdfunding campaigns.
 - Conducted counselling and academic guidance sessions for 200+ poor students.