SAGORIKA NAG

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EDUCATION

Degree	School/College	CPI/ Percentage	Year
IDD (B. Tech+M.Tech) in Pharmaceutical Engineering & Technology	Indian Institute of Technology (BHU), Varanasi	9.36/10	2019-2024 (Ongoing)

RELEVANT EXPERIENCE

Bioinformatics Intern at TU Munich, School Of Life Sciences **May'22-**
Supervisor: Prof. Dr. Dmitry Frishman, TUM
Tools/Skills Used: Python, Deep Learning, Immunology
- TCR-epitope binding prediction model was created by exploiting AI and a pre-trained state-of-the-art protein language model (pLM) to aid in the development of T-cell mediated immunotherapy approaches.
- Various ratios of negative to positive samples were tested
- An accuracy of 96% was achieved

Bioinformatics Intern at Rothamsted Research, Harpenden, England **Jun'22-April'23**
Supervisor: Dr. Dan Smith, Bioinformatics Scientist, RRes
Tools/Skills Used: Python, Linux, SQLite, MUMmer4, Screed, OMA, BLAST, Circos
- Conducted wheat pangenomic analysis to identify genetic factors controlling frost tolerance
- QTL analysis to study structural variation amongst various cultivars was conducted

Nyberman Internship in Bioinformatics **Jan'22-Mar'22**
Supervisor : Dr. Sudharsana Rajan
Tools/Skills Used: Clustal, NGPhylogeny, SIFT, Provean, Predyflexy, SWISS-MODEL, PyMOL
- Conducted comparative studies of the various variants of SARS-CoV-2
- Analyzed mutations in spike glycoprotein of these variants
- Tolerance, stability, and flexibility of the mutation was observed using bioinformatic tools.
- Performed protein modeling and docking studies

Visiting Scholar at Blue Marble Space, Institute Of Science (BMSIS) **Oct'21-May'23**
Supervisor: Prof. Shiladitya DasSarma, University of Maryland, Baltimore County
Tools/Skills Used: SWISS-MODEL, DeepView, Clustal Omega, Inkscape
- Examined the UV-resistant properties of extremophiles like Haloachaea
- Analyzed Haloarchaeal DNA repair systems, especially photorepair
- Performed phylogenetic analysis, synteny analysis, and structural protein studies
- Correlated the mutations in the protein photolyase with the survival of Halophiles under varying UV strengths

Member of Khattri Lab, IIT-BHU **Aug'21-**
Supervisor: Prof. Arun Khattri, IIT-BHU
Tools/Skills Used: R programming, Microarray data analysis, PTM Biology
- Study the role of Sialyltransferases and *SIGLEC*s in Head and Neck Squamous Cell Carcinoma (HNSCC)
- Preprocess HNSCC microarray datasets extracted from NCBI GEO using R
- Visualization and interpretation of results

Research Associate at Blue Marble Space, Institute Of Science **June-Aug'21**
Supervisor: Prof. Shiladitya DasSarma, University of Maryland, Baltimore County
Tools/Skills Used: Clustal Omega, NGPhylogeny.fr, Trex, Haloweb, NCBI-BLAST, etc
- Used bioinformatics approaches to study the evolution and survival of extremophiles
- Determined Horizontal Gene Transfer (HGT) in various DNA repair systems among the three domains of life.

Exploratory Project: Neurotoxicity/Neuroprotectivity prediction **Jan-April'20**
Supervisor: Prof. Senthil Raja, IIT-BHU
Tools/Skills Used: Python, Machine Learning, Deep Learning
- Use DL models (ANN) and ML (SVM) to create a Neurotoxicity/neuroprotectivity classifier.
- Collect SMILES of selected compounds and calculate chemical descriptors from Biotriangle
- Accuracy of 81% was achieved

PUBLICATIONS

1. **Nag, S.**, DasSarma, P., Crowley, D.J., Hamawi, R., Tepper, S., Anton, B.P., Guzmán, D. and DasSarma, S. (2023). Genomic Analysis of Haloarchaea from Diverse Environments, including Permian Halite, Reveals Diversity of Ultraviolet Radiation Survival and DNA Photolyase Gene Variants. Microorganisms, [online] 11(3), p.607. doi:https://doi.org/10.3390/microorganisms11030607.

2. **Nag, S**., Mandal, A., Joshi, A., Jain, N., Srivastava, R.S., Singh, S. and Khattri, A. (2022). Sialyltransferases and Neuraminidases: Potential Targets for Cancer Treatment. Diseases, [online] 10(4), p.114. doi:10.3390/diseases10040114.

3. **Nag, S**., Baidya, A. T. K., Mandal, A., Mathew, A. T., Das, B., Devi, B., & Kumar, R. (2022). Deep learning tools for advancing drug discovery and development. *3 Biotech*, *12*(5). https://doi.org/10.1007/s13205-022-03165-8

4. Bhattarai, S., Kumar, R., **Nag, S**., & Namasivayam, V. (2022). Big Data in Drug Discovery. *Machine Learning and Systems Biology in Genomics and Health*, 17–48. https://doi.org/10.1007/978-981-16-5993-5_2

CONFERENCE PRESENTATIONS

1. DasSarma, S., DasSarma, P., Kimmance, O., **Nag, S**., Soto, L. M., Anton, B. P., & Crowley, D. J. (2022, May 18). *Bioinformatic Approaches to Understanding the Evolution and Survival of Extremophiles*. Agu.confex.com; AGU. https://agu.confex.com/agu/abscicon21/meetingapp.cgi/Paper/1027995

2. **Nag, S**., DasSarma, P., & DasSarma, S. (2023, Feb 4). Bioinformatic Approaches to Understanding Photorepair Capabilities of Diverse Halophilic Archaea. Inter IIT Tech Meet 11.0 's STUDENTS' ACADEMIC CONFERENCE (SAC).

SCIENCE COMMUNICATION

1. Presented at BlueSciCon'2021, a scientific seminar series conducted by Blue Marble Space, Institute Of Science (BMSIS), on the topic: "**DNA repair in extremophiles**."
Link : https://www.youtube.com/watch?v=K2leOoBP0fU&t=4s (27th Aug 21)

2. Delivered a presentation on "**Scope of Bioinformatics and Interdisciplinary Research**" to high school students at Jamnabai Narsee School, Gujarat, India. (27th July 23)

AWARDS AND EXTRA-CURRICULARS

- Selected for **DAAD-WISE'23 Scholarship** for a 68-day fully funded internship at **TU Munich, School Of Life Sciences.**
- Selected for **Mitacs Globalink Research Internship, Canada,** for a 12-week fully funded opportunity at **Université Laval**.
- Selected for the **Young Scientist Program** conducted by **Blue Marble Space, Institute of Science (BMSIS)**
- Member of **Genelab Multi-Omics AWG**
- Qualified **IIT (JEE) Advance 2019** and was amongst the top **0.05%** out of 11 lakh applicants
- Volunteer at **IIT-BHU Research Community**
- Mentored students for **Sophomitra**, an initiative by IIT-BHU Research Community to encourage students to take up research.
- Former Captain of the **IIT-BHU Girls Kabaddi Team**.

RELEVANT COURSES

- **Academic Courses:** Fundamentals of Bioinformatics (Ongoing)**,** Biology, Essentials of Biochemistry, Computer Programming, Human Physiology, Probability and Statistics, Microbiology and Biotechnology, Principles and Techniques in Molecular Biology, Radiation Biology and its Biomedical Application, Structural Biology, Computational Chemistry, Computational Drug Design

- **Online courses:** Machine Learning Specialization by Andrew Ng Stanford Coursera, Machine Learning A-Z™: Hands-On Python & R In Data Science by Udemy, Kaggle courses on Data visualization and SQL, Genome Sequencing I and Genome Sequencing II by California San Diego, Python for Genomic Data Sciences by Johns Hopkins University and Python skills for handling biological data by Stepik.

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