

Prasanna Sarmah

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Education

- **CSIR-North East Institute of Science and Technology, Jorhat, India (under AcSIR)**

Ph.D., Biological Sciences | 2022 – Ongoing

- **North Eastern Hill University, Shillong, India**

M.Sc., Biotechnology & Bioinformatics | CGPA: 3.65/6 | 2018 – 2020

- **North Eastern Hill University, Shillong, India**

B.Sc., Biotechnology | Percentage: 60.38% | 2015 – 2018

Key Skills

Omics & Bioinformatics

- Transcriptomics (RNA-seq, scRNA-seq), genomics, proteomics
- RNA-seq and scRNA-seq analysis for biomarker identification
- Handling complex biomarker datasets (transcriptomics, proteomics)
- Multi-omics data integration
- Pathway-level analysis (KEGG, Reactome, GO, GSEA)
- Gene co-expression and biological network analysis

Statistical & High-Dimensional Data Analysis

- Principal Component Analysis (PCA)
- Cluster analysis (hierarchical, k-means, density-based)
- Bootstrap and resampling techniques
- Regularisation methods (LASSO, Ridge, Elastic Net)
- Support Vector Machines (SVM)

Machine & Deep Learning

- Advanced Python programming; frameworks: PyTorch, TensorFlow, JAX
- Expertise in supervised, unsupervised, and reinforcement learning algorithms
- Neural networks: CNNs, RNNs, Transformers
- Applied ML in drug discovery: QSAR, ADMET, binding site prediction

- **R & R-Shiny** for advanced statistical analysis and interactive dashboards
- Python (NumPy, SciPy, scikit-learn, pandas)

Computational Drug Discovery

- Molecular design, docking, binding site prediction, ADMET profiling, mRNA vaccine design
- Protein structure modeling, molecular dynamics simulation (GROMACS, AMBER, NAMD)
- MM-PBSA/GBSA, ligand-protein interaction analysis
- Protein structure modeling and homology modeling

Bioprocess Engineering

- Cellulase activity assays (FPase, CMCase, beta-glucosidase, DNS method).
- Enzyme activity and enzyme kinetics.
- Microbial cell culture and formulation optimisation
- Scale-up strategies and bioreactor.

Wet lab experiment

- DNA extraction, RNA extraction, qRT-PCR, Cell culture, Plant tissue culture, Bioprocess engineering.

Experience

Project Associate | CSIR-North East Institute of Science and Technology (CSIR-NEIST), Jorhat, India | 5 years

- Computational analysis and identification of phytochemicals against major human diseases
- Biomarker-driven pathway and network analysis in stress signaling and disease resistance
- Integration of omics data with machine learning for biological insight and prediction
- Collaborative research across experimental and computational teams

Certificates

- Certification course on Molecular Dynamics, Udeemy
- Chem Bio IT-QSAR Workshop 2022, organized by NIPER Mohali
- NGS analysis and Drug discovery hands-on training, IBAB Bangalore
- Poster presentation at the International Conference on CRISPR & Computational Biology

Publications

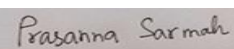
- Sarmah, P., Das, B., Verma, J. S., & Banik, D. (2024). The functional and structural characterisation of the bZIP transcription factors from *Myristica fragrans* Houtt. associated to plant disease-resistant defence: An insight from transcriptomics and computational

modelling. *International Journal of Biological Macromolecules*, 268, 131817.

- Sarmah, P., Goswami, S., Verma, J. S., & Banik, D. (2025). Computational approach to investigate the role of *Myristica fragrans* Houtt. compounds for human acetylcholinesterase. *Journal of Molecular Structure*, 1332, 141655.
- Sarmah, P., Borah, T., Mudoi, K. D., Verma, J. S., & Banik, D. (2025). In vitro micropropagation of the critically endangered *Aquilaria malaccensis* Lam. and comparing the effect of PGRs' through machine learning models. *Plant Cell, Tissue and Organ Culture (PCTOC)*, 162(1), 6.
- Sarmah, P., Das, B., Saikia, J., Konwar, P., Mudoi, K. D., Saikia, S. P., & Banik, D. (2022). An insight into the immunomodulatory potential of wood oil of *Aquilaria malaccensis* Lam. with an emphasis into related phytomedicine, biomarkers, pharmacology, and toxicity. *South African Journal of Botany*, 151, 695-712.
- Sarmah, P., Konwar, P., Saikia, J., Borah, T., Verma, J. S., & Banik, D. (2024). Screening of potent inhibitor from *Aquilaria malaccensis* Lam. against arachidonic inflammatory enzymes: an insight from molecular docking, ADMET, molecular dynamics simulation and MM-PBSA approaches. *Journal of Biomolecular Structure and Dynamics*, 42(22), 12622-12636.
- Cecilia, L., Kumar, N., Sarmah, P., Verma, J. S., & Saikia, R. (2025). Genome-wide analysis of CaPDF genes encoding γ -thionin-containing plant defensins in *Capsicum annum* L.: insight into oomycete-responsive expression and computational modelling. *Physiological and Molecular Plant Pathology*, 102980.
- Baruah, D., Phukan, A., Sarmah, P., Banik, D., & Tamuly, C. (2025). Development and Optimization of Process for Preparation of Pineapple Wine Using RSM: Exploring Oleochemicals and Anti-Urease Activity for Enhanced Functional Properties. *ChemistrySelect*, 10(17), e202405465.
- Borah, T., Sarmah, P., Konwar, P., Saikia, J., Washmin, N., Saikia, S. P., & Banik, D. (2025). Physico-chemical, nutritional, and anti-inflammatory properties of processed *Garcinia pedunculata* fruit: A combined in vitro and in silico approach. *Food Research International*, 201, 115580.
- Borthakur, S., Sarmah, P., Saikia, M., Dhakal, R., Gupta, D. D., Kalita, J., ... & Dutta, P. (2025). Computational insights into insect-derived semiochemicals from Formicidae family as potential JAK1 inhibitors: Virtual screening and molecular dynamics studies. *Computational Biology and Chemistry*, 108730.
- Washmin, N., Sarmah, P., Konwar, P., Borah, T., Saikia, J., Phukan, A., & Banik, D. (2025). Impact of Different Drying Techniques on *Parkia timoriana* Pods: Physicochemical, Nutritional, and Bioactive Insights Through In Vitro and In Silico Approaches. *Journal of Food*

Science, 90(4), e70228.

- Konwar, P., Saikia, J., Das, B., Sarmah, P., & Banik, D. (2025). Application of ecological niche model in agro-climatic suitability evaluation of major economic plants. In *Forests for Inclusive and Sustainable Economic Growth* (pp. 437-450). Elsevier.
- Saikia, J., Washmin, N., Borah, T., Sarmah, P., Konwar, P., Siga, A., ... & Banik, D. (2023). Physicochemical properties, chemical composition and sensory attributes of *Alpinia nigra* (Gaertn.) BL Burtt rhizome: an underutilized spice source. *European Food Research and Technology*, 249(4), 1097-1112.
- Mudoi, K. D., Borah, P., Gorh, D., Gupta, T., Sarmah, P., Bhattacharjee, S., ... & Saikia, S. P. (2023). Biotechnological interventions and societal impacts of some medicinal orchids. In *Advances in orchid biology, biotechnology and omics* (pp. 59-144). Singapore: Springer Nature Singapore.
- Barman, R., Saikia, J., Sarmah, P., Konwar, P., Kumar, M., Bora, P. K., ... & Banik, D. (2023). Oxygenated sesquiterpenes, molecular docking, and the trait-linked occurrence of essential oil in *Knema angustifolia* (Roxb.) Warb (Myristicaceae). *South African Journal of Botany*, 159, 617-626.
- Barman, R., Saikia, J., Sarmah, P., Konwar, P., Saikia, S. P., Haldar, S., & Banik, D. (2024). The oleochemical potential of some wild nutmegs from North East India. *Biochemical Systematics and Ecology*, 117, 104904.



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