

Arif Hossin

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Education

UNIVERSITY OF CINCINNATI

PhD Candidate, Computational Biochemistry. GPA:3.76

Cincinnati, OH, USA

KHULNA UNIVERSITY

- Master of Pharmacy, Pharmacy. GPA:3.61 (WES evaluation)
- Bachelor of Pharmacy, Pharmacy. GPA: 3.37 (WES evaluation)

Khulna, Bangladesh

Experience

UNIVERSITY OF CINCINNATI

Graduate Research/Teaching Assistant

USA

August 2022–Present

- Performed all-atom molecular dynamics simulations using GROMACS and Python-based workflows to investigate force-mediated disaggregation of amorphous protein aggregates derived from the Titin I27 domain, revealing how pulling direction and random pulling-site selection influence disaggregation efficiency and mechanical breakdown pathways, and exploring which structural features of the aggregate contribute to resistance during translocation through the ClpB central pore.
- Conducted all-atom molecular dynamics simulations of the wild-type (WT) STS-1 protein and two mutant variants to investigate the effects of point mutations on the dimer interface. Performed detailed analyses of structural stability, flexibility, and interactions at the dimer interface, as well as key dynamic properties and allosteric communication pathways, to characterize mutation-induced changes in protein behavior and function.
- Performing all-atom molecular dynamics simulations using LAMMPS and Python-based workflows to investigate pristine and graphene-reinforced EMDA–TMA vitrimers, gaining molecular-level insights into dynamic covalent bond exchange, thermal transport, and network rearrangement, and examining how nanofillers affect self-healing efficiency, mechanical recovery, and polymer network dynamics for sustainable, high-performance polymer design.
- Teaching Assistant for General Chemistry laboratory and recitation courses; provided instruction, supervised experiments, and assisted students with problem-solving.
- Grader for Physical Chemistry, evaluating assignments and exams with accuracy and consistency.

SQUARE PHARMACEUTICALS LIMITED

Bangladesh

Sr. Executive, Manufacturing

April 2016–August 2022

- Collaborated with cross-functional teams (R&D, Validation, QA, Engineering) on new product development, process validation, and product launch activities and ANDA submissions.
- Supervised and led a team of executives and junior colleagues to ensure smooth and efficient production operations.
- Supported and successfully faced audits from global regulatory authorities (US-FDA, UK-MHRA, TGA) while maintaining compliance with cGMP standard.

Executive, Quality Operations

June 2014–March 2016

- Ensure the manufacturing and packaging operation is operating in full compliance with cGMP, SOP, safety and established standards.
- Technical review of BMR, BPR, Process Validation Protocol, and Process Validation Report, SOP, and EOP before approval.

Other Experience

- Hands-on experience in drug discovery and predictive modeling through Udemy course projects, applying QSAR and Graph Neural Networks on small datasets. Developed Python ML pipelines for

molecular property prediction and bioinformatics applications, including DNA sequence analysis, RNA-Seq (NGS), and disease classification.

- Hands-on experience with TensorFlow through course-based projects (Udemy), including building, training, and evaluating neural networks for classification and representation learning tasks using Python.
- Practical training in machine learning methods including linear and logistic regression, classification, clustering (k-means, hierarchical), dimensionality reduction (PCA), tree-based models (Random Forest, XGBoost), clustering, and model evaluation techniques, as part of a PhD-level data science course, with hands-on implementation using Python and scikit-learn.
- Hands-on experience building a personal RAG-based AI chatbot through a Udemy course, leveraging LLMs, LangChain, LangGraph, ElevenLabs, Agentic RAG, and MCP for end-to-end conversational AI workflows.
- Hands-on experience building FastAPI applications in local development environments through course-based projects (Udemy), including creating REST endpoints, routing, request/response handling, and testing API workflows.
- Developed Python-based web scraping scripts (BeautifulSoup, Selenium, Scrapy) to extract and clean large datasets.
- Designed, customized, and implemented HTML, CSS, PHP, and jQuery to build responsive, SEO-friendly, client-specific WordPress themes.

Honors and Awards

- Doctoral Enhancement fellowships for the Spring 2026 semester for research accomplishments to date and future research potential
- Procter & Gamble Poster Award, for delivering a concise and innovative research talk during the Oesper Symposium Poster Session (2025)
- Henry Hochstetter Prize, for excellence as a Graduate Teaching Assistant (2023)

Technical Skills

Computational Modeling & Simulation

- Molecular Dynamics: GROMACS, LAMMPS, Protein & Polymer Simulations, All-Atom Simulations
- Gaussian (DFT), Vitrimer Modeling, Basic Molecular Docking

Machine Learning & AI

- Supervised & Unsupervised Learning, Regression, Classification, Clustering (K-means, Hierarchical), Dimensionality Reduction (PCA), Ensemble & Tree-based Models (Random Forest, XGBoost), Model Evaluation
- Deep Learning: TensorFlow, Neural Networks (CNNs, RNNs, GNNs), NLP
- Generative AI & LLMs: LangChain, LangGraph, Agentic RAG, AI Chatbots, Multi-Agent Systems, Voice Agents (ElevenLabs)

Cheminformatics & Bioinformatics

- QSAR Modeling, Molecular Property Prediction, RDKit, SMILES Processing, Molecular Fingerprinting, Virtual Screening
- DNA/RNA-Seq (NGS) Analysis, Mutation Prediction, Disease Classification, Genomic Data Processing

Data Engineering & Automation

- Web Scraping & Automation: BeautifulSoup, Selenium, Scrapy, Playwright, n8n
- Data Pipelines: End-to-end ML pipeline development, data extraction, cleaning, preprocessing

Cloud, APIs & Deployment

- Docker, FastAPI, REST APIs, Streamlit
- AWS & Azure deployment

Programming & Scientific Computing

- Python (NumPy, SciPy, Pandas), R, SQL

DevOps & Collaboration

- Git, GitHub

References

Dr. George Stan

Professor of Chemistry

Head, Department of Chemistry

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