SHUMSUL AREFIN

Chemical Engineering | Materials and Nano Science | Computational Materials

Dhaka, Bangladesh +880 1632 932416 shamsul.20ace006@gstu.edu.bd

LinkedIn | Personal Website | ORCID | ResearchGate | Google Scholar

Research Objective

To pursue advanced research in computational and experimental materials science, integrating synthesis of nanocomposites and functional oxides with DFT/VASP-based first-principles modeling to design and optimize novel materials for energy, environmental, and biomedical applications, aiming to bridge synthesis and computation toward sustainable material innovation.

Education

Gopalganj Science and Technology University (GSTU), Bangladesh *May 2022 - August 2026*

Bachelor of Science in Engineering, Applied Chemistry and Chemical Engineering
CGPA: 3.834/4.0 (1st out of 31)
Undergraduate Project: First-Principles Investigation on the Magnetism-Dependent Physical Properties of Orthorhombic $NdCuO_3$ Perovskite

Teaching Experience

Part-Time Undergraduate Instructor *July 2026 - Present*

Department of Applied Chemistry and Chemical Engineering, GSTU

Research Experience

Undergraduate Research Assistant *January 2024 - Present*

Supervisor: Dr. Md. Kamruzzaman, Professor and Chairman, Dept. of ACCE, GSTU

- Conducting research in materials science and nanotechnology: synthesizing g-C_3N_4, metal oxides (green approach) and their Janus structures, and chitosan, alginate, and related nanocomposites
- Developing new functional perovskite materials using the DFT method in the Vienna Ab initio Simulation Package (VASP)

Trainee - Industrial Process Unit Operation and Process Control Technique *July 2025 - August 2025*

Training Institute for Chemical Industries (TICI), Narshingdi, Bangladesh (On-site)

- One-month training; Grade: A+ (1st out of 31)
- Coursework: Process Technology, Instrumentation and Control Engineering, Mechanical Engineering, Analytical Chemistry, Industrial Safety

Trainee - Computational Chemistry *August 2025 - September 2025*

Computer in Chemistry & Medicine Lab (Online)

- Four-day training program; Grade: Excellent

Publications

1. **Arefin, S.**, Rabbi, S. F., Munshi, H., & Islam, D. (2026). Magnetic alginate-based composites for wastewater treatment: synthesis, performance, and environmental applications. *Separation and Purification Technology*, 138619.
2. Munshi, M. H., Islam, M. D., Kamruzzaman, M., Hussain, S. A., **Arefin, S.**, Rabbi, S. F., et al. (2026). Chitosan/MXene biodegradable films for sustainable UV-shielded food packaging application. *Packaging Technology and Science*.
3. Islam, T., Munshi, M. H., Saha, R., Hussain, S. A., Shafin, A. A., **Arefin, S.**, & Kamruzzaman, M. (2026). Nonwoven-based textile architectures for energy storage applications: materials, preparation, characterization, and prospects. *Advanced Materials Interfaces*.
4. Multifunctional activities of peanut shells and its application: a review of recent research. *Review Paper (under revision).*
5. Jute fiber-based composites: fabrication methods, property enhancement strategies, structure-property relationships, and applications. *Review Paper (ongoing).*
6. Green nano-filters/membrane for clean water purification system. *Book Chapter (under review).*
7. Fundamentals, mechanisms, and applications of 2D material-based photocatalysis. *Book Chapter (ongoing).*
8. Poster Presentation, 1st International Conference on Multidisciplinary Research in Sciences, Comilla University (Jan 09, 2026). *"Sustainable Chitosan/MXene Biodegradable Films for UV Shielded Food Packaging."*
9. Poster Presentation (1st Place), 3rd International Conference on Textile Science and Engineering, BUTEX (May 24, 2025). *"Chitosan-Based Nanocomposites from Sustainable Resources; Used as Coating Materials in Textile Applications for UV Resistance and Antimicrobial Protection."*

Skills

- **Wet Lab:** HPLC, GC, UV-VIS spectra, FTIR
- **Dry Lab:** First-principle analysis (SCF, band gap, ESP, DOS, photovoltaic properties, etc.), spectral analysis, Python (NumPy, Matplotlib, Seaborn, Pandas)
- **Research Software:** VASP, VESTA, Avogadro, ChemDraw, Gaussian 09W, GaussView 6.0, Gabedit, GaussSum, OriginPro, DWSIM, ArcGIS, Mendeley, Overleaf
- **Other Software:** LaTeX, Adobe Photoshop, Illustrator, Premiere Pro, After Effects, Blender

Projects

- **IoT-Based, Renewable, and Environment-Friendly Solar Still** for the desalination of saline water (Top 10, Water Hackathon): proposed a solar still concept for coastal Bangladesh, organized by BRAC and IRCWASH
- **3D Research Models and Animations**: produced detailed models and animations to support research presentations and studies (Blender, Adobe After Effects, Premiere Pro)
- **The Health Nourish App**: an AI-based (LLM) machine learning model integrated into a mobile app (Python, Flutter)

Extracurricular Activities

President *November 2025 - Present*

ACS Student Chapter, GSTU

Managing Secretary *November 2024 - November 2025*

ACS Student Chapter, GSTU

- Designed the logo and managed social media presence
- Developed and maintained the chapter's website (acs-gstu.web.app)
- Coordinated FY2024-25 events, technical operations, video production, and banner/poster design

Senior Producer *March 2024 - Present*

The Wizzy Corporation

- Conducted research-related 3D modeling and developed web solutions for versatile applications

Designer and Infographer (Freelancer) *January 2022 - December 2024*

10 Minutes School

Vice President *July 2019 - December 2019*

SGCD Photography and Arts Club

Project Developer Head *September 2018 - October 2019*

Sabujbagh Government College Science Club

Certifications and Achievements

- Scholarship Award Ceremony for the Meritorious and Unprivileged Students, GSTU 2026
- Scholarship Award Ceremony for the Meritorious and Unprivileged Students, GSTU 2025
- Placed 2nd in University Innovation Hub Program, GSTU 2025
- Finalist, BRAC Water Hackathon 2025
- Placed 1st in Poster Presentation, 3rd International Conference on Textile Science and Engineering 2025
- 3rd Place, 12th DRMC National Science Carnival 2019
- Best Reader of the Year, Bishwo Shahitto Kendro 2017
- 1st in Chitroangkan Competition, Excellence in Creative Arts 2015

Languages

Bengali: Native or Bilingual Proficiency

English: Professional Working Proficiency

Volunteer Work

- Instructor at IEEE for "2-Day Workshop on MS PowerPoint, MS Word, and Creating Effective Presentation Slides"
- Co-Lead at NASA International Space Apps Challenge
- Instructor at Programming and Soft Skills Club for "Slidecraft: Slide Design with PowerPoint and Canva"
- Technical Support at Sabujbagh Government College (Hall of Fame - Sabujbagh Government College)

References

Dr. Md. Kamruzzaman
Professor
Dept. of ACCE, GSTU
+880 1777 656796
mkamruzzamandu81@gmail.com

Dr. Mottakin
Associate Professor
Dept. of ACCE, GSTU
+880 1747 336813
mottakin@gstu.edu.bd

S. M. Fazle Rabbi
Lecturer
Dept. of ACCE, GSTU
+880 1679 45780
rabbi.oni.3344@gmail.com