

SAFIUS SAKIB SHUDDHO

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EDUCATION

Bachelor of Science in Nuclear Engineering

Jul 2025

Military Institute of Science and Technology, Dhaka, Bangladesh

- CGPA: 3.49/4.00

RESEARCH EXPERIENCE

Undergraduate Thesis

Jan 2024 – May 2025

NEUTRONICS CHARACTERISTICS ANALYSIS AND IMPROVEMENTS IN LEAD-COOLED FAST REACTORS (ALFRED) AND A CONCEPTUAL DESIGN OF A MULTI-PURPOSE RESEARCH REACTOR (MPRR).

Supervised by Prof. Dr. Abdus Sattar Mollah

Publications and Conference Projects

1. Shuddho, S. S., Sunny, A. A., & Mollah, A. S., "Neutronic Performance of Reflector Materials in Lead-cooled Fast Reactor," *Under Review in Nuclear Engineering and Design*, 2025
2. Zarin N. Z., Sunny A. A., Shuddho, S. S. and Mollah, A. S., "Investigation of Neutronics Parameters of Multi-Purpose Research Reactor (MPRR) using VVR-KN Fuel." *International Conference on Electronics and Informatics 2024*, AEC, DHAKA, 2024.
3. Dipto, R. R., Shuddho, S. S., Sunny, A. A., & Mollah, A. S., "Analysis of Neutronics Parameters of Different Annular Fuel using Monte Carlo Code OpenMC Utilizing JEFF-3.3 and ENDF/B-VIII.0 Nuclear Data Libraries," *Proceedings of the Energy Conference 2023: National and Global Issues (ENCON23)*. Available at <http://dx.doi.org/10.2139/ssrn.4997514>.

RESEARCH INTERESTS

- Particle Physics, Astroparticle Physics
- Physics Beyond the Standard Model, Dark Matter Physics
- Nuclear Physics, QCD

WORKSHOPS AND COURSES

1. **Second Joint ICTP-IAEA Workshop on Open-Source Nuclear Codes for Reactor Analysis**, ICTP, Trieste, Italy 2025
 - Participated in hands-on sessions with OpenMC, OpenFOAM, MOOSE, and Cardinal.
 - Presented a poster titled "*Neutronic Evaluation of Reflector Materials for the ALFRED Core*".
2. **Fundamentals of Reactor Physics with Python**, International Atomic Energy Agency (IAEA) 2025
 - Covered reactor physics fundamentals—including neutron slowing down theory, multi-group transport and diffusion equations, point reactor kinetics, and fuel depletion modeling.
 - Books:** *Nuclear Reactor Analysis* (Duderstadt & Hamilton, 1976) and *Nuclear Reactor Physics* (Stacey, 2nd ed.).
 - Completed 11 guided datalabs and 8 independent assignments in Python, solving neutron balance, slowing-down spectra, and time-dependent reactor equations, and extending to Monte Carlo sampling, numerical diffusion, reactor kinetics, subcritical system analysis, and full-core OpenMC simulations.
3. **MTV Nuclear Engineering Summer School**, University of Michigan 2023
 - Covered foundational nuclear topics including nuclear structure, gamma and neutron physics, radiation detection, imaging, and fission science.
 - Attended lectures on Monte Carlo methods, nuclear data evaluation, and integral experiment design.
 - Explored advanced applications such as non-destructive assay, radioxenon monitoring, radiation protection, radiotherapy planning, and nuclear science outreach.
4. **CS50: Introduction to Computer Science**, Harvard University 2023
 - Gained proficiency in C, Python, SQL, JavaScript, and web technologies (HTML/CSS) while applying concepts such as data structures, resource management, security, and web development.
 - Completed 9 rigorous problem sets and delivered a final programming project.

TECHNICAL SKILLS

- **Computational Tools:** OpenMC, MOOSE (*and Cardinal*), OpenFOAM (*and Foam4Nuclear*), ARMI, OpenModelica, COMSOL Multiphysics
- **Programming Languages:** Python (*NumPy, SciPy, Matplotlib, Pandas, PyNE*), C/C++, MATLAB
- **OS and Other Tools:** Linux, LaTeX, Microsoft Office, Git, GitHub

AWARDS AND ACHIEVEMENTS

Bronze Honour, International Astronomy and Astrophysics Competition (IAAC) **2022**

EXTRACURRICULAR ACTIVITIES

President, MIST Nuclear Engineering Club (MNEC) **2024 – 2025**
Club Coordinator, MIST Nuclear Engineering Club (MNEC) **2023 – 2024**