Khaled Mosharraf Mukut, Ph.D.

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Professional Summary

Postdoctoral Associate in Mechanical Engineering specializing in **CFD, multiscale modeling, and high-performance computing**. Proven track record in leading research on **soot formation and combustion**, with multiple publications and a distinguished research fellowship. Passionate about mentoring students and collaborating across disciplines to drive innovative solutions.

Technical Skills

Programming Languages: Python, C/C++, MATLAB, FORTRAN, HTML, Bash
Simulation Tools: OpenFOAM, LAMMPS, ANSYS, COMSOL, CONVERGE CFD
Engineering Tools: VS Code, PyCharm, SolidWorks, Tecplot, Paraview, Tableau
Technologies/Frameworks: Linux (HPC), Git, Docker, MPI/OpenMP

Professional Experience

University of Minnesota Twin Cities (CRFEL) **Sep 2026 – Present**
Postdoctoral Associate *Minneapolis, MN, USA*
- Developing OpenFOAM-based solvers for **electrochemical and plasma-assisted reacting flows**, coupling **Poisson–Nernst–Planck** ion transport with chemistry, electrode kinetics, electrical double layers, and electro-osmotic flow.

Marquette University **Oct 2025 – Sep 2026**
Postdoctoral Research Fellow *Milwaukee, WI, USA*
- Leading advanced research on **microclimate modeling** at a city-block scale using **high-fidelity CFD**.
- Developing frameworks for optimizing **load balancing** in large-scale **Lagrangian-Eulerian simulations** on HPC systems.

Marquette University **Aug 2017 – Aug 2025**
Graduate Research Assistant *Milwaukee, WI, USA*
- Conducted research leading to **7 peer-reviewed journal publications** and presented findings at **8 major conferences**.
- Exhibited strong proficiency in multidisciplinary computational skills, encompassing **CFD and molecular modeling**.
- Instructed and graded undergraduate courses including Heat Transfer, Fluid Mechanics, and Thermodynamics.
- Mentored graduate students in essential research tools including Git, Linux, Python, and LaTeX.

Bangladesh University of Engineering & Technology **Mar 2016 – Aug 2017**
Graduate Assistant *Dhaka, Bangladesh*
- Mentored two undergraduate senior groups on molecular dynamics simulations and ANSYS modeling.
- Published **3 journal articles** and presented at 1 international conference.

Education

Marquette University **Aug 2019 – Aug 2025**
Ph.D. in Mechanical Engineering *Milwaukee, WI, USA*
- Dissertation: Molecular simulations of soot formation and morphology.

Marquette University **Aug 2017 – May 2019**
M.S. in Mechanical Engineering *Milwaukee, WI, USA*
- Thesis: Radiation effects on pollutant formation in spray combustion.

Honors and Awards

Richard W. Jobling Distinguished Research Fellowship **Aug 2023 – May 2024**
Marquette University

Outstanding Research Assistant Award **Mar 2021**
Marquette University

Dean's List Scholarship **2011 & 2012**
BUET

Leadership and Service

Python Summer School | Bootcamp for high school seniors **Jul 2023 & Jul 2025**
Marquette University
- Guided **15 students** to create their own air quality data visualizations using Python.

Entangled Air Exhibition | Art & Science Collaboration **Jan 2022 – May 2022**
Marquette University
- Developed artwork and led outreach initiatives raising awareness about air quality.

President | Bangladeshi Student Association (BSAMU) **Jun 2021 – May 2023**
Marquette University
- Led executive board of 10 members; organized cultural events and community service.

Selected Publications

- K. M. Mukut et al.: Fuel 406, 136692 (2026)
- T. P. Day, K. M. Mukut et al.: Proc. Combust. Inst. 41, 105821 (2025)
- A. Ganguly, K. M. Mukut et al.: Aerosol Research 3, 185 (2025)
- K. M. Mukut et al.: J. Phys. Chem. A 128, 5175 (2024)
- Full list: kmmukut.github.io/publications