

Musanna Galib

4-Year Doctoral Fellow (4YF) at Department of Mechanical Engineering

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EDUCATION	Ph.D. • Mechanical Engineering (CGPA: 87%) UBC, Vancouver, BC, Canada Dissertation title: Dendrite Inhibition Strategy using Hetero-epitaxy in Thin Film Deposition Mechanics [Sep 2020 - April 2025 (<i>expected</i>)]
	M.Sc. • Mechanical Engineering (CGPA: 3.92/4.00) BUET, Dhaka, Bangladesh Dissertation title: Study of electro-mechanical properties of manganese-based nanocomposites for supercapacitors [Apr 2017 – May 2019]
	B.Sc. • Mechanical Engineering (CGPA: 3.92/4.00) BUET, Dhaka, Bangladesh Dissertation title: Computer Modeling of Fire Smoke Movement in Multizone Structure Using Two Open Source Platforms [Apr 2012 - Feb 2017]
RESEARCH EXPERIENCE	Machine Learning Research [2023- 2025] • Interatomic potential development at Modeling and Simulation Research Group, UBCV
	Battery Research [2020- 2025] • Multi-scale modeling at Modeling and Simulation Research Group, UBCV • Battery testing at Advanced Materials for Energy Storage Lab, UBCO
TEACHING EXPERIENCE	Graduate Teaching Assistant (5 courses) Dept. of Mechanical Engineering, UBC [Sep 2022- Apr 2025] Dept. of Physics, UBC [Jan 2024- Apr 2024]
	Exam Invigilator • Centre for Accessibility, UBC [Nov 2021- Apr 2025] • UBC Sauder School of Business [Dec 2021- Apr 2025]
	Assistant Professor of Teaching (10 Courses) Dept. of Mechanical Engineering, BUET [May 2019- Sep 2021]
	Lecturer (13 Courses) Dept. of Mechanical Engineering, BUET [May 2017- May 2019]
TECHNICAL SKILLS	Programming Languages: Python, MATLAB, Bash, C, HTML, CSS. Deep Learning Packages: PyTorch. Material Simulation Tools: VASP, LAMMPS. FEM Modeling Tools: ABAQUS, MOOSE. Visualization & Design Tool: Vesta, OriginPro, OVITO, Paraview, AtomsK, Solidworks. Battery Testing: Battery cell assembly, Cyclic testing, In-situ optical microscopy. Clean-room Testing: DEKTAK profilometer. High-performance Computing (HPC): Alliance, ARC Server. Documentation & Presentation Application: Office Suite, LaTeX. Operating System: Windows (WSL), Linux (Ubuntu).

HONORS & AWARDS

- 1st prize in “Ideas With Impact” Competition by The Institute for Computing, Information and Cognitive Systems (ICICS) (Link) [May 2024]
- CSME Congress “Best Presentation Award” in Computational Mechanics at University of Toronto [May 2024]
- Conference Travel Support for ICICS Graduate Students for SES-2023 [Aug 2023]
- Collaborative Research Mobility Award (UBC CRMA) in UBC [Jan - Dec 2023]
- 4-Year Doctoral Fellowship in UBC [Sep 2020 - Aug 2024]
- Faculty of Applied Science Graduate Award in UBC [Sep 2021]
- President’s Academic Excellence Initiative Ph.D. Award in UBC [Sep 2020 - Apr 2025]
- International Tuition Award in UBC [Sep 2020 - Apr 2023]
- Bangladesh-Sweden Trust Fund (BSTF) Travel Grant for Ph.D. [2021]
- Dean’s List for 4 consecutive years in BUET [Feb 2013 - Feb 2017]
- University Merit for 4 consecutive years in BUET [Feb 2013 - Feb 2017]
- Board Scholarship in HSC 2011 [Jan 2011]
- Board Scholarship in SSC 2009 (37th (among 900k students) in Bangladesh). [Jan 2009]

GRANTS & FUNDING

- DRI EDIA Champions in Digital Research Alliance of Canada [Amount: 35,000 CAD]
- 4-Year Doctoral Fellowship in UBC [Amount: 93,267 CAD]

PUBLICATION *Journal Publication*

- **Galib, M.**, Liu, J., and Ponga, M., ‘Dendrite Inhibition using Heteroepitaxial Residual Stress in Thin Film Deposition’, ACS Energy Letters, 2024 (Under Preparation).
- Isiet, M., **Galib, M.**, Dadap, J., Ye, Z., and Ponga, M., ‘Understanding the spall behavior of alumina: A combined high-fidelity informed molecular dynamics and dual-pulse laser-induced femtosecond experiment approach’, Advanced Materials, 2024 (Under Preparation).
- **Galib, M.**, Orhan, K.O., Liu, J., and Ponga, M., ‘Residual Stress Development in Lattice Mismatched Epitaxial Thin Films via Atomic and Molecular Layer Depositions’, Journal of the Mechanics and Physics of Solids, 2024 (Under Review). (Link)
- Xu, J.* , **Galib, M.*** , Wu, Z., Tao, L., Shao, Y., Zhang, Y., Guo, X., Hansen, E. J., Chen, Y., Wang, Z., Liu, C., Ponga, M., and Liu, J., ‘High-entropy Strategy to Suppress Volumetric Strain and Enhance Diffusion Rate of Na₃V₂(PO₄)₂F₃ Cathode for Durable and High-area-capacity Zinc-ion Battery Pouch Cells’, Nano Energy, 2024 (Under Review). (*Co-first authors)
- Khan, A.A., Rabi, S.S., Jamee, T. **Galib, M.**, Ashek, F.E., and Rahman, M.A., ‘Effects of Crumpling Stage and Porosity of Graphene Electrode on the Performance of Electrochemical Supercapacitor,’ 2024, J. Phys. Chem. B (Accepted). (Link)
- **Galib, M.**, Orhan, K.O., and Ponga, M., ‘Engineering Chemo-Mechanical Properties of Zn Surfaces via Alucone Coating’, 2022, J. Phys. Chem. C, 127, 5, 2481–2492. (Link)
- **Galib, M.**, Hosen, M.M., Saha, J.K., Islam, M.M., Firoz, S.H., and Rahman, M.A., ‘Electrode Surface Modification of Graphene-MnO₂ Supercapacitors using Molecular Dynamics Simulations’, Journal of Molecular Modeling, 26, 251, 2020. (Link)
- Saha, P., Ishtiaque, M.M.U., Sutradhar, A., **Galib, M.**, and Hannan, M.A., ‘A sustainable approach to improve the efficiency of Earth Pipe Cooling System’, International Journal of Sustainable Engineering, 13, 5, 387-397, March 2020. (Link)

Conference Publication

- Arka, A.M., Mridha, R.H., Shafqat, R., **Galib, M.**, and Morshed, AKM M., ‘Design and Comparative Parametric Analysis Using NSGA-II for Multivariable Constrained Optimization of Shell and Tube Heat Exchangers’, 13th International Conference on Mechanical Engineering (ICME), December 2019, Dhaka, Bangladesh (Link)

- Saha, P., **Galib, M.**, Ishtiaque, M.M.U., Akanda, S.R., and Hannan, M.A., ‘Numerical Study on Improving the Efficiency of the Earth Pipe Cooling System’, International Conference on Civil and Environmental Engineering (ICCEE 2018), November 2018, Kuala Lumpur, Malaysia. (Link)
- Khandoker, M.A.R., **Galib, M.**, Islam, A., and Rahman, M.A., ‘Modeling of smoke movement in multizone garments building using two open source platforms’, The 7th BSME International Conference on Thermal Engineering 2016, June 2017, Dhaka, Bangladesh. (Link)
- Chatterjee, A., **Galib, M.**, and Sarkar, M.A.R., ‘Application of Arduino in designing modern electromechanical laboratory’, 2017 IEEE International Conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI), June 2018, Chennai, India. (Link)

Poster Presentation

- **Galib, M.**, Liu, J., and Ponga, M., ‘Dendrite Inhibition Strategy using Hetero-epitaxial Residual Stresses in Thin Film Deposition Mechanics’, 16th World Congress on Computational Mechanics (WCCM), 24 July 2024, Vancouver, British Columbia.

Book Chapter

- Pelletier, J. and **Galib, M.**, ‘Engineering Solutions to Equity, Diversity, and Inclusion’ chapter in the book ‘Equity, Diversity & Inclusion: Sisyphean Undertaking to an Achievable Reality’, 2024 (Under Review).

INVITED TALKS

- ‘Dendrite Inhibition Strategy using Hetero-epitaxial Residual Stresses in Thin Film Deposition Mechanics’ [25 July 2024]
16th World Congress on Computational Mechanics (WCCM 2024)
Vancouver, British Columbia, July 21 - 26, 2024
- ‘Multiscale Approach to Study High Strain Rate Deformation’ [27 May 2024]
Canadian Society for Mechanical Engineering (CSME)
Toronto, Ontario, May 26-29, 2024
- ‘Dendrite Inhibition Strategy using Hetero-epitaxial Residual Stresses in Thin Film Deposition Mechanics’ [9 October 2023]
Society of Engineering Science Annual Technical Meeting (SES 2023)
Minneapolis, Minnesota, October 8-11, 2023
- ‘Using Thin Film to Improve Metal Anode Battery Safety’ [9 March 2023]
Top presenter, Open heat - 3 Minutes Thesis (3MT)
Vancouver, UBC, March 9, 2023
- ‘Residual Stresses in Thin Film Deposition Mechanics’ [19 October 2022]
Society of Engineering Science Annual Technical Meeting (SES 2022)
College Station, Texas, October 16 - 19, 2022

SOFTWARES

Python Packages

- Imagekit: Dendrite tracking from in-situ optical microscopy (Link)
- pyVASPNN: Pre & post-processing of VASP data to extxyz for neural network training (Link)
- pyMOOSE: Post-processing software for exodus file (Link)

PROFESSIONAL EXPERIENCES

- Member, Battery Division, The Electrochemical Society (ECS) [2024-2025]
- Member, Canadian Society for Mechanical Engineering (CSME) [2024-2025]
- Member, Board of Undergraduate Studies of Mechanical Engineering, BUET [2017-2021]
- Member, Bureau of Research, Testing and Consultation (BRTC), BUET [2019-2021]
- Member, Publication and Secretariat committee, The 12th & 13th International Conference on Mechanical Engineering (ICME 2017 (Link) & 2019 (Link)) [2017, 2019]

REVIEWER

- Additive Manufacturing [ISSN: 2214-8604]

EXTRA-CURRICULAR ACTIVITIES

- Steward, UBC Teaching Assistants' & Instructors Union (CUPE 2278) [2024-2025]
- Vice President (Academic), Mechanical Engineering Graduate Association, UBC [2022-2023]
- Award Leader, The Duke of Edinburgh's Award Foundation Bangladesh [2017-2021]
- Gold Awardee of 'The Duke of Edinburgh's Award' [2017]
- Financial Secretary at BUET Self Defense Club [2016-17]
- Member at United Nations Youth and Students Association of Bangladesh [2013-16]

REFERENCES

- Mauricio Ponga, Ph.D.
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