

Md. Didarul Islam

Jinju, South Korea

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Ph.D. Student | Doctoral Researcher | Computational Fluid Dynamics | Biofluids | Turbomachinery

Google Scholar (July 2026): 217 citations | h-index 7 | i10-index 6

Education

Gyeongsang National University <i>Ph.D. in Mechanical and Aerospace Engineering</i> Research: 3D upper-airway medical twin using CT-based CFD, reduced-order modeling and data-driven diagnosis of obstructive sleep apnea.	Jinju, South Korea Sep 2025 - Aug 2028 (expected)
Gyeongsang National University <i>M.Sc. in Mechanical Engineering - CGPA: 4.21/4.50</i> Thesis: Experimental and Computational Fluid Dynamics Analysis of Thrombin-Induced Coagulation in Complex Morphologies of Femoral Artery Pseudoaneurysms.	Jinju, South Korea Sep 2023 - Aug 2025
Dhaka University of Engineering & Technology <i>M.Sc. Coursework in Mechanical Engineering - CGPA: 3.83/4.00</i> Thesis works: Mechanical and thermal characterization of silicon-matrix composites.	Gazipur, Bangladesh 2019 - 2021
IUBAT - International University of Business Agriculture and Technology <i>B.Sc. in Mechanical Engineering - CGPA: 3.84/4.00; Rank: 1/92</i> Merit scholarship with 100% tuition waiver; practicum on refrigerator manufacturing and production processes.	Dhaka, Bangladesh 2014 - 2017

Research Experience

Flow Information Lab, Gyeongsang National University <i>Doctoral Researcher</i> - Develop a 3D upper-airway medical-twin workflow combining patient-specific geometry, transient CFD, and CNN-KAE/Koopman reduced-order models for non-invasive obstructive sleep apnea assessment. - Build CFD-to-data pipelines for pressure and velocity fields, breathing-diagram and breathing-power feature extraction and comparison with clinical diagnostic indicators. - Conduct CFD, PIV-supported validation, and design optimization for hubless rim-driven propellers and pump systems used in marine propulsion and high-rise firefighting applications.	Jinju, South Korea Sep 2025 - Present
Flow Information Lab, Gyeongsang National University <i>Graduate Research Assistant</i> - Designed and analyzed in vitro and CFD studies of thrombin-induced coagulation in femoral artery pseudoaneurysms, linking morphology, injection location and treatment outcomes. - Integrated urinary-tract experiments, SEM observations, and CFD wall-shear-stress analysis to evaluate ureteral-stent drainage and encrustation behavior. - Supported turbomachinery studies on pump optimization, solid-liquid two-phase flow, cavitation, and erosion using ANSYS CFX and experimental performance data.	Jinju, South Korea Sep 2023 - Aug 2025
Department of Mechanical Engineering, IUBAT <i>Undergraduate Thesis Supervisor</i> Supervised undergraduate projects in experimental mechanics, energy systems, composites and design; guided research planning, data interpretation and academic writing.	Dhaka, Bangladesh Jan 2021 - Aug 2023

Teaching & Industry Experience

IUBAT - Department of Mechanical Engineering <i>Senior Lecturer (on study leave)</i> Taught and coordinated undergraduate courses and laboratories in thermodynamics, engineering mechanics, materials science, mechanical drawing, and computer applications; mentored student research and design projects.	Dhaka, Bangladesh Jan 2022 - Present
IUBAT - Department of Mechanical Engineering <i>Lecturer</i> Delivered lectures, tutorials, laboratory instruction, assessment, and academic advising across core mechanical-engineering subjects.	Dhaka, Bangladesh Jan 2020 - Dec 2021
Shams Engineering <i>Assistant Engineer (Mechanical)</i> Supported mechanical and MEP design work, including HVAC, fire safety, domestic-water systems, equipment selection, drawings and technical reporting.	Dhaka, Bangladesh Jan 2019 - Dec 2019
Pubergaon Polytechnic and Medical Institute <i>Instructor</i> Provided classroom and practical instruction for engineering students, emphasizing technical drawing, mechanics, and workshop-based learning.	Bangladesh Jan 2018 - Dec 2018
Minister Hi-Tech Park <i>Industrial Intern</i> Completed industrial training in refrigerator production, assembly, quality control, and manufacturing workflow.	Bangladesh Sep 2017 - Dec 2017

Selected Research Projects

- **3D Upper Airway Medical Twin for Non-Invasive OSA Diagnosis**
Glocal R&D Research Center | Sep 2025 - Aug 2028 | Ongoing
- **Global Aerospace Digital Composites Pioneering Research**
GADIST Research Center, GNU | Mar 2025 - Feb 2027 | Ongoing

- **Rim-Driven Pump-Equipped Firefighting Drone for High-Rise Building Response**
College of Space and Aeronautics Research Center, GNU | Apr 2025 - Feb 2026
- **Computational Fluid Dynamics Analysis for Small-Hydropower Bypass Piping**
K-water | Feb 2025 - Dec 2025
- **Optimal Thrombin Injection Method for Femoral Artery Pseudoaneurysm Treatment**
National Research Foundation of Korea | Sep 2023 - Feb 2025
- **Double-J Ureteral Stent Improvement Study**
National Research Foundation of Korea | Sep 2023 - Feb 2024

Selected Publications

1. **Islam, M. D.**, Lee, C. J., & Kim, H. H. Numerical Approach to Performance Analysis of Modified Duct Shapes for Electric Hubless Rim-Driven Propellers. *Journal of Mechanical Science and Technology* (2026) - **Accepted**.
2. Jeong, J. M., Lee, C. J., **Islam, M. D.**, & Kim, H. H. Numerical Study on the Blade Shape Optimization of a Rim-Driven Pump for High-Rise Firefighting Drones. *Journal of Mechanical Science and Technology* (2026) - **Accepted**.
3. Zhang, J., Rakibuzzaman, M., **Islam, M. D.**, Zhou, L., & Kim, H. H. Design Optimization of a Double Volute Centrifugal Pump: A Numerical Study. *Irrigation and Drainage* (2026) - **Accepted**.
4. Choi, Y. H., Cho, S., Tae, S. J., Kang, H. J., **Islam, M. D.**, et al. Experimental Investigation of Ultraguided Thrombin Injection Outcomes in Complex Morphologies of Iatrogenic Femoral Artery Pseudoaneurysms. *Journal of Thrombosis and Haemostasis* (2026).
5. Kang, H.*, **Islam, M. D.***, Choi, Y. H., Kim, H. H., & Koo, B. Koopman Theory-Based Reduced-Order Modeling for Diagnosing Obstructive Sleep Apnea Using Breathing Power Diagram. *Physics of Fluids* 38, 021917 (2026).
6. Kang, H. J., **Islam, M. D.**, Choi, Y. H., Lee, Y. K., Song, M. J., & Kim, H. H. Thrombin-Induced Thrombosis Models for Ultrasound-Guided Thrombin Injection of Femoral Artery Pseudoaneurysms. *Physics of Fluids* 37 (2025).
7. **Islam, M. D.**, Kang, H. J., Tae, S. J., Kim, K. W., Choi, Y. H., et al. Experimental and CFD Analysis of Flow Impediments and Encrustation in Ureteral Stents Using an In Vitro Urinary Tract Model. *Scientific Reports* 15, 22034 (2025).
8. Bae, Y. S., **Islam, M. D.**, Choi, Y. D., Kang, H. J., Tae, S. J., & Kim, H. H. Back-Turn Approach for Optimal Operation of Booster Pump Systems. *Journal of Applied Fluid Mechanics* 18(9), 2202-2211 (2025).
9. Rakibuzzaman, M., **Islam, M. D.**, Kim, H. H., Suh, S. H., Zhou, L., & Iqbal, A. P. Numerical Simulation of Solid-Liquid Two-Phase Flow Analysis of Submersible Drainage Pumps. *Irrigation and Drainage* (2025).
10. Rakibuzzaman, M., Suh, S. H., Kim, H. H., **Islam, M. D.**, Zhou, L., & El-Emam, M. A. Cavitation and Erosion Effects on Hydraulic Performances of a Submersible Drainage Pump. *Alexandria Engineering Journal* 113, 431-450 (2025).
11. **Islam, M. D.**, Kim, J. S., Jeon, S. J., Kang, H. J., Kim, K. W., et al. A New Approach to Evaluate Obstructive Sleep Apnea According to Body Mass Index Using Breathing Diagram. *Physics of Fluids* 36, 091903 (2024).
12. Rakibuzzaman, M., Kim, H. H., Suh, S. H., **Islam, M. D.**, & Zhou, L. Effects of Cavitation and Erosion on Submersible Drainage Pumps: A Numerical Study. *Physics of Fluids* 36 (2024).

Complete publication list: [Google Scholar](#)

Selected Conference Presentations

- 2026:** *CFD-PIV Analysis and Performance Optimization of Hubless Rim-Driven Systems*. ISROMAC19, Waseda University, Japan (Keynote Lecture).
- 2026:** *OSA Diagnostic Index Prediction Using CFD and CNN-KAE*. 14th National Congress on Fluids Engineering, South Korea.
- 2025:** *CFD Analysis of Duct Shape Effects on Thrust in Electric Hubless Rim-Driven Propellers*. Korean Society of Fluid Machinery Winter Conference, South Korea.
- 2025:** *Back-Turn Method for Energy Optimization in Booster Pump Systems*. 5th IAHR Asian Working Group Symposium on Hydraulic Machinery and Systems, South Korea (**Best Presentation Award**).
- 2025:** *Effects of Cavitation and Erosion on the Hydraulic Performances of SDPs*. 4th Asian Workshop on Hydraulic Machinery, Japan.
- 2024:** *Flow Performance and Encrustation Analysis of Ureteral Stents Using an In Vitro Urinary System*. KSME Winter Conference, South Korea.
- 2024:** *Pseudoaneurysm Treatment and Ureteral-Stent Encrustation Studies*. 26th International Congress on Theoretical and Applied Mechanics (ICTAM 2024), South Korea (**Two presentations**).

Awards, Scholarships & Professional Engagement

Awards: Young Pioneer Researcher Award, Gyeongsang National University (2025, 2026); Best Presentation Award, IAHR-Asia (2025); Miyan Publication Reward, IUBAT (2024-2026).

Scholarships: GNU Fellowship (2023-2028); CSA Research Scholarship (2025-2026); Merit-Based Scholarship with 100% Tuition Waiver, IUBAT (2014-2017).

Recognition: Co-authored SPE Polymers review recognized by Wiley among the top 10% most-viewed papers published in the journal in 2024.

Professional Program: Selected Member, KIRD Global R&D Career Salon - Group 7 "K-ResearChain" (Jul-Nov 2026).

Memberships: Korean Society of Fluid Machinery; Korean Society of Mechanical Engineers; Biomedical Engineering Society for Circulatory Disorders.

Skills

CFD & Simulation: ANSYS CFX, ICEM CFD, ANSYS Workbench, transient and multiphase CFD, turbulence modeling, cavitation/erosion analysis, CFD-experiment validation.

Scientific AI & Numerical Methods: Python, MATLAB, C, Google Colab, Dynamic Mode Decomposition, Koopman theory, CNN-KAE reduced-order modeling, optimization, statistical analysis.

CAD & Geometry: AutoCAD, SolidWorks, Siemens NX, ANSYS SpaceClaim, 3D Doctor.

Experimental & Visualization: Particle image velocimetry (PIV), in vitro flow systems, ImageJ, SEM-data interpretation, RStudio, Minitab, MS Excel, Draw.io, Canva.

Research Tools & Languages: LaTeX, Overleaf, Git/GitHub, Mendeley, EndNote, Zotero; Bangla (native), English (advanced).