

Khairuzzaman Mamun, Ph.D.

Research Engineer, Data Scientist

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ABOUT ME

Research engineer and data scientist with a Ph.D. in Mechanical Engineering and a foundation in mathematics, statistics and physics. Over 12 years across research and industry: C++ computer-vision and camera-calibration software running on mass-production lines in Japan, CFD/FEA simulation in a JAXA collaboration, and machine learning from physics-informed neural networks to fine-tuning vision-language models. I take an unfamiliar problem, model it mathematically and deliver it as reliable production software. Seeking an R&D, data-science or ML-engineering role.

WORK EXPERIENCE

2022 – present **Research Engineer (Research & Solutions Engineering)**
Innovative System Solutions · Morioka, Japan

- Built full-stack C++/MFC stereo-camera calibration software for mass production, used by two major Japanese manufacturers; it has calibrated nearly 2,000 fisheye, monocular and stereo cameras.
- Designed C++ algorithms that measure the curvature of convex mirrors with a ZED stereo camera, driving automated inspection machinery for automotive side glass.
- Developed back-end modules for 3-camera and 5-camera panoramic-view calibration systems for next-generation Mazda and Toyota vehicles.
- Trained deep-learning models in Python/PyTorch for industrial automation and camera-based inspection.
- Led on-site development, installation and debugging at customer plants in Japan and India; turned customer problems into technical requirements and delivered on committed timelines.
- *Key result:* an automated curvature-measurement machine in India inspects each mirror in 0.5 s, with 99.7% faster cycle time, nearly 100% less manual work and accuracy raised from 50% to 99.99%.

2020 – 2022 **Post-doctoral Researcher**
Iwate University · Morioka, Japan

- Predicted flutter of a rocket-engine turbopump turbine blade with JAXA: pre-stressed modal analysis (ANSYS Mechanical) coupled with CFD (ANSYS CFX, RANS/SST); identified the stable inter-blade phase-angle range.
- CFD, FEA and fluid–structure interaction (FSI) analysis; authored technical papers.

2017 – 2020 **Research Assistant**
Iwate University · Morioka, Japan

- Supported CFD and FSI research projects, managed the laboratory and mentored undergraduate students.

2012 – 2017 **Teaching Assistant**
Dhaka University of Engineering & Technology · Gazipur, Bangladesh

- Taught mathematics to undergraduates; assisted professors with CFD research and research papers.

EDUCATION AND TRAINING

2017 – 2020 **Doctor of Engineering (Ph.D.), Mechanical Engineering**
Iwate University · Morioka, Japan
Thesis: computational simulation of physiological blood flow through arterial stenosis, measuring the effects of stenotic shapes on flow parameters.

2012 – 2015 **Master of Philosophy, Applied Mathematics**
Dhaka University of Engineering & Technology · Gazipur, Bangladesh
Thesis: simulation of pulsatile blood flow through arterial stenosis.

2011 – 2013 **Master of Business Administration, Finance & Banking**
Jahangirnagar University · Dhaka, Bangladesh
Thesis: technical analysis with Bollinger Bands, an empirical study on the Dhaka Stock Exchange.

2010 – 2011 **Master of Science, Mathematics**
Jahangirnagar University · Dhaka, Bangladesh

2006 – 2010 **Bachelor of Science, Mathematics**
Jahangirnagar University · Dhaka, Bangladesh

LANGUAGE SKILLS

Mother tongue Bengali

Other languages	Understanding		Speaking		Writing
	Listening	Reading	Spoken production	Spoken interaction	
English	C1	C1	C1	C1	C1
Japanese	B1	A2	B1	B1	A2
Hindi	B2	A1	B1	B1	A1
Urdu	B2	A1	B1	B1	A1

Levels: A1–A2 basic user, B1–B2 independent user, C1–C2 proficient user (Common European Framework of Reference for Languages, self-assessed).

DIGITAL SKILLS

Machine learning PyTorch, deep learning, fine-tuning (LoRA/QLoRA), vision-language models, physics-informed neural networks, LLM APIs

Data science Statistics, regression, SPSS, NumPy, Matplotlib, data pipelines, evaluation and error analysis

Computer vision Camera calibration, stereo vision, camera geometry, image processing, OpenCV, ZED SDK (depth, point clouds)

Programming C++, Python, C, MFC/Win32, STL, Qt, OpenMP/OpenACC offloading, PHP, JavaScript, Git

Simulation Mathematical modelling, CFD (finite volume), FEA, FSI, ANSYS Fluent / CFX / Mechanical, SolidWorks

Optimization Gradient descent, Newton–Raphson, least squares, geometric and measurement modelling, error analysis

PROJECTS

2026 – present **Vision-language model for Japanese garbage-collection calendars**
Few-shot fine-tuning of Qwen3-VL-4B with QLoRA on a single 8 GB laptop GPU to read municipal garbage calendars (image/PDF to structured schedule). Built the data pipeline, ground-truth set and evaluation. Journal paper in preparation.

2026 **drmamun.org, multilingual portfolio with AI**
Custom WordPress plugin (PHP/JavaScript): site in 11 languages with LLM-based automatic translation, an AI chatbot that answers in the visitor's language, right-to-left support and accessibility tuning.

Community **Web apps for iwate-bd.org**
Prayer-times PWA with web-push notifications and a halal food-ingredient checker (ingredient dictionary, Open Food Facts integration) for the Bangladeshi community in Japan.

PUBLICATIONS

Selected

- K. Mamun. Computational simulation for the prediction of a rocket turbine blade's flutter.
- K. Mamun, K. Funazaki. Comparative study of non-Newtonian physiological blood flow through an elastic stenotic artery with a rigid-wall stenotic artery.
- K. Mamun, K. Funazaki, S. Akter, M. N. Akhter. The effect of magnetic field on blood flow through a stenotic artery: a review on bio-magnetic fluid dynamics.
- K. Mamun, K. Funazaki, M. N. Akhter. Statistical analysis for measuring the effects of stenotic shapes and spiral flows on wall shear stress.
- Book: Simulation of Pulsatile Blood Flow through Arterial Stenosis.

10 research papers and one book in total; full list at drmamun.org.

COMMUNICATION AND ORGANISATIONAL SKILLS

- Requirement analysis and technical discussion directly at customer sites; on-site installation, debugging and troubleshooting.
- Cross-cultural teamwork in Japanese and Indian industrial settings; laboratory management and student mentoring.
- Technical writing: research articles, review papers, theses.

References available upon request.