

Mohammad Khalikujjaman

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ACADEMIC & RESEARCH
CV · MECHANICAL
ENGINEERING · MSc
CANDIDATE

PROFILE

Mechanical engineer and Aarhus University MSc candidate combining computational modelling with experimental validation. Research spans tribology, CFD and wake-model uncertainty, test-to-model correlation, reliability and energy systems. Current MSc thesis develops application-relevant validation methods for food-grade grease in industrial robot reduction gears.

CORE CAPABILITIES

Research methods	Experimental design · verification and validation · model-test correlation · uncertainty and sensitivity analysis · technical writing
Computation	OpenFOAM · Python · ANSYS APDL / pyMAPDL · COMSOL · MATLAB · PyPSA · FLORIS · ParaView
Experimental	Bruker UMT TriboLab · ball-on-disc · scratch testing · three-point bending · Gwyddion · instrumented heat transfer

CURRENT RESEARCH

Food-grade grease benchmarking for industrial robot reduction gears

Feb - Jun 2026

Industry-linked R&D; · Two-person team · Aarhus University · 10 ECTS, grade 10 (ECTS B)

- Planned and executed 23 ball-on-disc trials on a Bruker UMT TriboLab across 20–70 N and 75–367 rpm; most runs lasted 1,800 s.
- Built one Python workflow that removed the 0–300 s run-in and calculated mean COF, standard deviation, coefficient of variation and drift consistently.
- Best food-grade condition achieved mean COF 0.0946 at 2.0% CV, but visible material removal prevented a replacement recommendation based on friction alone.

SELECTED RESEARCH PROJECTS

Wind-farm wake modelling in OpenFOAM, validated against LES

May 2026

Individual Wind Energy project · Aarhus University

- Built realizable k- ϵ RANS actuator-disk models for three six-turbine layouts: 7D aligned, 5D aligned and 7D staggered.
- Post-processed rotor-averaged deficit, turbulence intensity and normalised row power in Python; row-power RMSE ranged from 0.037 (staggered) to 0.083 (5D aligned).
- Identified overly rapid RANS wake recovery as a non-conservative source of aligned-array power error.

Sandwich-composite characterisation and test-to-model correlation

2026

Design of Composite Structures · Aarhus University

- Combined microscopy and two-span three-point bending to estimate a 66.39 GPa face modulus and 146 MPa core shear modulus.
- Correlated COMSOL solid and ABD shell models with measured force; long-span shell error was -0.08% , increasing to $+4.81\%$ at short span where transverse shear dominated.

PEER-REVIEWED PUBLICATION

M. S. A. Towhid, M. R. Islam, M. Khalikujjaman and B. T. Costa, "Waste heat recovery-based seawater desalination for sustainable maritime operations: a study on heat transfer, techno-economic feasibility, and environmental impact," Journal of ETA Maritime Science, 13(3), 260–276, 2025. DOI 10.4274/jems.2025.76259. Contribution: data collection and processing, analysis and interpretation, software and validation.

ADDITIONAL RESEARCH & MODELLING

Verification and validation of an OpenFOAM cylinder-wake benchmark

May 2025

CFD course · Team of four · Aarhus University

- Established mesh independence at 25,100 cells and time-step independence with CFL-consistent refinement.
- Extracted a 0.17 Hz shedding frequency by FFT, giving $St = 0.17$: within 3.1% of an empirical correlation and 3.4% of published drag data.

Reliability-oriented structural analysis with pyMAPDL

2026

Computational mechanics · Team project · Aarhus University

- Automated a parameterised ANSYS model, generated a 15-point central composite design and fitted a quadratic response surface.
- Monte Carlo evaluation found no samples above the 50 MPa yield criterion inside the investigated geometry and loading range.

European power-system storage analysis in PyPSA

2026

Energy Systems · Team of three · Aarhus University

- Evaluated 13 scenarios under a 24% nuclear cap and 20/40/55% carbon caps.
- Hydrogen storage reduced annual system cost by EUR 14.44bn, curtailed energy from 109.15 to 0.03 TWh/year and eliminated load shedding in the reference setting.

EDUCATION

MSc Mechanical Engineering — Aarhus University, Denmark

Feb 2025 - Jan 2027
(expected)

90 of 120 ECTS completed as of August 2026; MSc thesis in progress.

- Focus: CFD, wind and renewable energy, tribology, FEA, reliability, composites, applied mathematics and data science.

BSc Naval Architecture & Marine Engineering — BUET, Bangladesh

2013 - 2018

CGPA 3.36 / 4.00.

- Undergraduate thesis on waste-heat desalination and full preliminary design of a 1,300-tonne inland cargo vessel.

PROFESSIONAL EXPERIENCE

Assistant Naval Architect — BIWTA Dredging Department

Jun 2019 - Mar 2022

Contracted via Shahin Engineering & Services · Dhaka, Bangladesh

- Supported three national dredger procurement programmes covering 65 vessels; ran launching, commissioning and acceptance trials across six vessel classes.
- Inspected 700, 600 and 500 mm cutter-suction dredger construction, checked work against specification, and prepared tender documentation and AutoCAD drawings.

Probationary Officer → Senior Officer — United Commercial Bank PLC

Mar 2022 - Jan 2025

Business Operations Division · Dhaka, Bangladesh

- Diagnosed core-banking system and process faults, coordinated fixes and tested results before live release; left to begin full-time MSc study.

LANGUAGES & AVAILABILITY

Languages: Bengali (native) · English (professional working; IELTS Academic 6.5, November 2022) · Danish (currently studying)
Availability: Full-time graduate roles from February 2027 · References available on request