Doyal Kumar Sarker

(+1) 689-837-7133 | Doyal.Kumar.Sarker@ucf.edu | GoogleScholar | ResearchGate
https://www.linkedin.com/in/doyal

EDUCATION

University of Central Florida (UCF) — **Orlando, FL**
Ph.D. in Mechanical Engineering (Ongoing) — **Aug. 2021 - Dec. 2026**

- **Research Concentration:** Dynamics and Controls, Non-Linear Dynamics, Hydrodynamics and Aerodynamics, Fluid-Structure Interaction
- **CGPA:** 4.00/4.00

University of Central Florida (UCF) — **Orlando, FL**
M.S. in Mechanical Engineering — **Aug. 2021 - April. 2024**

- **Thesis:** Acausal Modeling and Validation of Platform Hydrodynamics of a Floating Offshore Wind Turbine
- **CGPA:** 4.00/4.00

Bangladesh University of Engineering and Technology (BUET) — **Dhaka, Bangladesh**
M.S. in Naval Architecture and Marine Engineering — **Oct. 2017 – June 2021**

- **Thesis:** Numerical Analysis of Turbulent Flow around the Ship Hulls using STAR-CCM+
- **CGPA:** 3.83/4.00

Bangladesh University of Engineering and Technology (BUET) — **Dhaka, Bangladesh**
B.S. in Naval Architecture and Marine Engineering — **Feb. 2013 – Sep. 2017**

- **Thesis:** Numerical Predictions of Calm Water Resistance of a Modern Surface Combatant
- **CGPA:** 3.76/4.00 (Class Rank 1st)

EXPERIENCE

Graduate Research Assistant — **Orlando, FL**
Hybrid Sustainable Energy Systems Laboratory, UCF — **Aug. 2021 - Present**

- Engineered a control-oriented, reconfigurable, and acausal floating turbine simulator (CRAFTS) utilizing multi-physics modeling to expedite the aero-hydro-servo-elastic simulations for various floating offshore wind turbine (FOWT) configurations (**DOE/ARPA-E funded project**).
- Validated offshore platform dynamics simulated by CRAFTS against NREL's OpenFAST tool and FOCAL experimental data, achieving a model accuracy of ±15% in key motion responses.
- Enhanced computational efficiency of hydro-elastic simulation by approximately 8 times compared to OpenFAST tool through the implementation of Strip-theory based hydrodynamic model for offshore platforms.
- Integrated a MATLAB/Simulink Genetic Algorithm (GA) optimization toolbox with CRAFTS to automate the calibration of hydrodynamic coefficient, significantly reducing manual tuning and weighting efforts.

Graduate Teaching Assistant — **Orlando, FL**
Department of Mechanical & Aerospace Engineering, UCF — **Aug. 2023 - Dec. 2023**

- Supported System Dynamics & Control coursework by guiding students in problem solving techniques and evaluating exams and assignments using established grading criteria.

Assistant Engineer (Mechanical) — **Dhaka, Bangladesh**
Bangladesh Inland Water Transport Authority (BIWTA) — **Sep. 2019 - July 2021**

- Directed dredging maintenance operations by coordinating the mobilization and operation of dredger vessels, developed technical specification and annual procurement plan to ensure uninterrupted dredging activities.
- Conducted through inspections of repair and maintenance for dredging units, focusing on marine propulsion, hydraulic, and mechanical systems, as well as engine units of crane boats.
- Designed a comprehensive 2D layout plan for the strategic arrangement of over 50 vessels, including the cutter suction dredgers and support vessels such as hydrographic survey units, at a newly established dredger base.

Adjunct Faculty (Part-Time) — **Dhaka, Bangladesh**
Sonargaon University — **Jan. 2018 - Jan. 2020**

- Instructed undergraduate courses in Naval Architecture, Marine Hydrodynamics, Dynamics of Marine Vehicles and Structural Mechanics, delivering comprehensive lectures, tutorials, and practical sessions.
- Developed detailed course materials and lecture notes; designed and evaluated assignments and exams, guided undergraduate projects on ship drawing and scantling using AutoCAD and recommended rule book.

EXTRACURRICULAR ACTIVITIES

Bangladeshi Student Association (BSA) at UCF **Orlando, FL**
Treasurer **April 2024 - April 2025**

- Managed financial budgeting and expense tracking for association events, including food catering and event decoration, under the Bangladeshi Student Association (BSA).
- Collaborated with BSA committee members to organize the annual cultural event *"BSA Night,"* promoting student engagement and community involvement.

SKILLS

- **Expertise:** Dynamics and Controls, Non-linear dynamic system modeling, Hydro-Aero Dynamics, Thermodynamics, Vibration and modal analysis, Wind energy, Fluid-structure interaction, Computational fluid dynamics (CFD), Finite element analysis (FEA).
- **Modeling & Simulation:** SIMULINK, Modelica/Dymola, OpenFAST, Star-CCM+, ABAQUS, OrcaFlex.
- **Programming & Data Science:** MATLAB, Python, Modelica
- **Design & CAD Tools**: AutoCAD, Rhinoceros (Rhino3D), MaxSurf, HydroStar
- **Documentation & processing**: LaTex, MS Office, Origin (Graphing)
- **Optimization & Control**: Genetic algorithm, Multi-objective optimization, LQR and PID controls, Active/Passive TMD vibration control, Mooring actuation.

SELECTED PROJECTS

OC7 Phase Ib (Systematic tuning of hydrodynamic drag and damping in different sea state):

- Investigated sea-state-dependent hydrodynamic damping coefficients for offshore platform in the IEA OC7 Phase Ib collaboration; developed a regression-based model for a priori coefficient selection across untested sea states, validated using CRAFTS maintaining ±15% modeling accuracy, and contributed to a joint publication.

FOCAL Campaign II (Semi-submersible hull control using tuned mass damper (TMD)):

- Participated in the FOCAL Campaign II study on semi-submersible hull control with TMDs; validated CRAFTS simulations against experimental data, achieving close agreement in tower-bending response and identifying overprediction in pitch-motion damping for future model refinement.

Finite Element Analysis (FEA) of wind turbine's tower:

- Conducted finite element modeling and vibration analysis of land-based and floating turbine tower's in ABAQUS, comparing beam and shell element performance, performing frequency and mode shape analysis.

CFD analysis in steady flow using STAR-CCM+:

- Conducted a CFD study for a fixed, partially submerged horizontal cylinder in 2D steady flow using STAR-CCM+. Implemented the finite volume method (FVM) with VOF for air–water interface capturing, performed mesh sensitivity and grid convergence index (GCI) studies, and validated results against experimental data.

Model Ship Propulsion Competition (MSPC):

- Designed 2D and 3D layouts of a catamaran-hull model ship in AutoCAD and fabricated the prototype for the *Model Ship Propulsion Competition (MSPC, 2015)* organized by the Dept. of Naval Architecture and Marine Engineering. Integrated and tested a remotely controlled propulsion system.

NOTABLE PUBLICATIONS

Research Impact (Google Scholar): Journal-5, Conference-7, Under review - 2

- **Sarker, D.**, Ngo, T., & Das, T. (2025). *Enhancement of hydrodynamics modeling for floating offshore wind turbines using multi-objective genetic algorithm*. Ocean Engineering, 342, 122842. https://doi.org/10.1016/j.oceaneng.2025.122842

- Wang, L., Robertson, A., Jonkman, J., ..., **Sarker, D.**, ... & Wright, C. (2025). *OC7 phase I: Toward practical sea-state-dependent modeling of hydrodynamic viscous drag and damping*. Ocean Engineering, 336, 121745. https://doi.org/10.1016/j.oceaneng.2025.121745

- **Sarker, D.**, Hasan, T., Ngo, T., & Das, T. (2024). *Causality-Free Modeling and Validation of a Semisubmersible Floating Offshore Wind Turbine Platform With Tuned Mass Dampers*. IEEE Journal of Oceanic Engineering, 49(4), 1430-1454. https://doi.org/10.1109/JOE.2024.3436773

- **Sarker, D.**, Tran, D., Mohsin, K., Odeh, M., Ngo, T., & Das, T. (2024). *Modeling, validation, and control of the IEA-15MW reference wind turbine and VolturnUS-S platform*. IFAC-PapersOnLine, 58(28), 1-6. https://doi.org/10.1016/j.ifacol.2024.12.001

- **Sarker, D. K.**, & Tarafder, M. S. (2024). *Numerical analysis of fluid flow around ship hulls using STAR-CCM+ with verification results*. Journal of Marine Science and Application, 23(2), 276-291. https://doi.org/10.1007/s11804-024-00424-3

HONORS & AWARDS

2025	**Judges Choice Award**, Poster Presentation in Student Scholar Symposium, University of Central Florida	*Orlando, FL*
2025	**Graduate Presentation Fellowship**, Modeling, Estimation and Control Conference	*Pittsburgh, PA*
2017	**University Merit Scholarship**, Bangladesh University of Engineering and Technology	*Dhaka, Bangladesh*
2017	**Dean's List**, Bangladesh University of Engineering and Technology	*Dhaka, Bangladesh*