

Motiuir Rahman

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133 Dudley Street, Cambridge, MA- 02140 || Willing to Relocate || U.S. Work Authorization

SUMMARY

- Expertise in **2D** and **3D CAD** models, assemblies, and detail drawing using **SOLIDWORKS (CSWA Certified)**.
- In-depth understanding of **Computational Fluid Dynamics (CFD)**, **Numerical Analysis**, **Fluid Mechanics**, **Heat Transfer**, **Aerodynamics**, and **Hydrodynamics**.
- Experience in doing **meshing** in **Ansys Workbench**, **SnappyHexMesh**, and **Pointwise**.
- Hands-on experience in running **CFD** simulations in **ANSYS Fluent** and **OpenFOAM**.
- Expertise in **single-phase** and **multiphase** flow simulations.
- Experience in multi-core high-performance computing (**HPC**) environment for parallel execution.
- Expertise in **computational cost** reduction process by using grid generation technique with more **accuracy**.
- Extensive coding experience in **MATLAB** and **C++**.
- Hands-on experience in **design, development, and test** prototypes using **DFSS** methodology.
- Hands-on experience in **Machining** and **Drilling** in **CNC**, **Lathe Machine**, and **Radial Drilling Machine**.
- Experience in Finite Element Analysis (**FEA**) coding and validation in **Abaqus**.
- Expertise in Microsoft Office suit including **Outlook**, **Excel**, **Word**, and **Powerpoint**.

EDUCATION

- M.S. in Mechanical Engineering, Computational Science** minor, **GPA 3.57** **May 2020**
University of Wyoming (UW) – Laramie, WY USA
- B.S. in Aeronautical (Aerospace) Engineering, GPA 3.63** **December 2016**
Military Institute of Science and Technology (MIST)-Bangladesh
Undergraduate Best Project Award: 2016, Dean's List Awards: 2014

TECHNICAL SKILLS

- CAD Designing Software: SolidWorks
- Machine Operation: CNC, Radal Drilling Machine, Lathe Machine
- CFD Simulation: OpenFOAM, ANSYS Fluent
- Meshing Tool/ Mesh Generation Software: Ansys Workbench, SnappyHexMesh, Pointwise
- Programming: C, C++ Object-Oriented Programming, Matlab
- OS: Windows, Linux, Virtual Machine (VirtualBox)
- Others: Latex, Microsoft Office, Microsoft Visual Studio, HPC Cluster, ParaView, Ansys Mechanical, Abaqus

CERTIFICATION

CSWA- Certification of Mechanical Design at the level of Associate (Issuing Organization: **Dassault Systèmes**;
Credential ID: **C-UK28WG63TX**)

Notable CAD Design

- Designing of shell-tube heat structure.
- Design ship deploying structure.
- Designed ship hull structure for dynamic motions response.
- Designed a Fighter Aircraft based on mission criteria.
- Designed a Open Circuit Subsonic Wind Tunnel.

WORK EXPERIENCE

- Mechanical Engineer, Vecarius, Inc.** **Oct 2020-Present**
- Support the development of the thermoelectric generator (TEG) from conceptual design.
 - Working on conjugate heat transfer CFD simulations for performance, analysis, and correlation development.
- Graduate Research Assistant, Multi-CFD Group, UW ME Department** **Jan 2018 - May 2020**
- Worked on dynamic motion response of an waterborne vessel (ship hull).
 - Designed ship hull structure for dynamic motions response.
 - Generated hull simulation grids using pointwise and snappyHexMesh. Meshing included overset mesh, structure mesh, unstructured mesh, hybrid mesh.
 - Conducted simulation of planing hull response in calm water, regular wave and irregular waves. Calm water investigation was presented in the APS conference. Link- <http://meetings.aps.org/Meeting/DFD18/Session/D32.4>
 - URANS solver in OpenFOAM namely interFoam, overInterFoam, and interDyMFoam was used to conduct these simulations.
 - Heave, trim angle, acceleration, resistance, and slamming pressure (in different probe locations) were calculated.

(Motiur Rahman, continued)

- Conducted grid convergence studies for coarsest to the finest grid and conducted State-of-the-Art (SOA) assessment for different Froude Numbers. Wrote bash scripts to run this simulations and post-processing in HPC.
- Resolved the spray root and the temporal evolution of the impulsive local slamming pressure.
- Conducted an extreme wave slam event correlation study in irregular waves using the CFD.
- Verification of Laminar and Validation of Turbulent Pipe Flows.
- Verification and Validation of Turbulent Flow around a Clark-Y Airfoil.
- Simulation of Turbulent Flow in an Asymmetric Diffuser.
- Simulation of Turbulent Flow over the Ahmed Body.
- Wrote several codes on order of accuracy of FD approximation; Explicit Vs Implicit Methods, Crank-Nicolson Method; Multi-dimensional FD Formulas.
- Simplified Model Equation (linear and non-linear convection equation, diffusion equation).
- Classified PDEs, and analyze consistency, stability, convergence, and physical interpretation of CFL condition.
- Numerical simulation of inviscid flows: Euler Equations; potential flow model.
- Schemes for linear and non-linear convection: Lax-Friedrichs; Lax-Wendroff; Multi-step schemes.
- Finite Volume Method (FVM) approach to evaluate PDEs.
- Wrote a finite volume code for solving 2D transport equation.
- Wrote a finite volume code for solving unsteady 2D conservation equations for scalar transport.
- Wrote a finite volume code for lid-driven cavity flow for uniform orthogonal grid using SIMPLE and PISO algorithm.
- Generated an FE script in MATLAB for quadrilateral elements in any 2D structure to calculate loads, displacements, stress, and strain.
- Validated FEA code for 2D structure (a cantilever bar) with Abaqus.

Graduate Teaching Assistant, UW Mechanical Engineering Department

Sept 2019 - May 2020

Thermal/Fluid Science Lab

- I demonstrated the experiment to the students, wrote lab manual and checked their lab report as well.
- Experiment included wind tunnel testing, HVAC system performance evaluation, pressure drop in water rig, heat transfer from a fin, blower characterization etc.

Numerical Analysis

- Teach students different numeric technique, and helped to in MATLAB coding.
- Made solutions with rubrics for exams, quizzes, and homeworks and graded them.

Undergraduate Research Assistant, Military Institute of Science and Technology

Jan 2016 - Dec 2016

Unmanned Aerial Vehicle (UAV) Project

- Designed two 3D Unmanned Aerial Vehicle (UAV) in SOLIDWORKS based on the mission criteria of the project.
- Conducted simulation in ANSYS fluent to check the performance and mission criteria.
- Made two prototypes and tested them in the wind tunnel and evaluated the performance.
- Manufactured two aircraft frames based on the design with balsa wood and carbon fiber.
- Assembled all the aircraft parts with all electrical equipment and tested it. The full work is presented in JMIER. Link- <http://jmier.elitehall.com/Vol%206%20No%202%20-%202.pdf>

Polymer Matrix Composite (PMC) Project

- Manufactured Polymer Matrix Composite (PMC) by Hand Lay-Up process.
- Determined machining problems in PMC such as delamination, fiber pull-out, cracks on varying drilling parameters like feed rate and drilling speed. CNC and radial drilling machine was used for machining. The full work is presented in AIP conference. Link- <https://doi.org/10.1063/1.5018525>

Intern Student, Biman Bangladesh Airlines, Non-Destructive Testing (NDT) Lab

Nov 2015- Dec 2015

- Conducted liquid penetrant inspection to get visual evidence of cracks, porosity.
- Conducted eddy current test for dimensional analysis of flaws.
- Investigated internal discontinuities by radiographic examination.

LEADERSHIP EXPERIENCE

- Vice-president of MAAC - MIST Aeronautics and Astronautics Club.
- Communication Secretary, Bangladesh Students' Association-BSA (UWYO).

Jun 2016-Dec 2016

Nov 2018-Oct 2019

WORKSHOP

- Fluid Power Control System.
- Remote Control Aircraft Design, Fabrication and Operation.