Imsara Samarasinghe

Flat 3B4, Parsons House, Claybrook Road, W6 8NB.
imsara256@gmail.com +44 (0) 7949 577223 Websites: LinkedIn, GitHub

Education

MEng. Aeronautical Engineering at Imperial College London **2020-2024**

- Graduated with an Upper Second Class Honours (Programme total: 65.77%)
- Received a score of 71.27% for final year research project
- Relevant Modules: Finite Elements (score: 76.45%), Computational Mechanics (score: 75.00%), CFD (score: 67.94%) and Applications of CFD (score: 64.50%)
- Edited Fortran code to simulate the flow field in a grid of circular cylinders
- Created C++ code utilising MPI libraries to solve CFD problems in HPC environment
- Experience using Star-ccm+ and Nektar++ to perform CFD simulation
- Experience using Python and Matlab to perform analysis of CFD data

Lyceum International School **2013-2019**

- A-Levels: Mathematics, Physics, Chemistry and Further Mathematics: A*A*A*A

Online Courses

The Finite Element Method for Problems in Physics – University of Michigan (Coursera) **2023**

- Learnt the mathematical formulation of the finite element method
- Used the C++ library, deal.II, to solve physics problems including heat transfer and elasticity

CFD Python: 12 Steps to Navier Stokes – Boston University (Open Course) **2023**

- Learnt the finite difference method for solving PDEs and the factors impacting numerical scheme stability and consistency
- Implemented a Python code for simulating 2D cavity and channel flow using FD methods

Research Experience

Optimising 3D Printed Bone Screws - Final Year Project - Awarded 71.27% **2024**

- Designed innovative screw structures that reduced shear stresses in bone by 70%
- Coupled Firedrake and IPOPT libraries using Python code to generate optimal geometries
- Gained hands-on experience of finite element modelling and topology optimisation
- Delivered a high-quality final presentation, achieving a grade of 78.00%

Laboratory Experience

3rd Year Swept wing wind tunnel testing **2023**

- Collaborated with a group of 5 to measure flow around a swept wing section
- Measure pressure around the aerofoil using manometers and produced accurate plots of flow parameters around the aerofoil
- Discussed 3D sweep effects and variation of pressure along the span of a wing, achieving a grade A

Coding Projects

MPI parallelised solver for lid driven cavity flow (C++) **2024**

- Changed existing C++ based solver by implementing MPI routines for distributed calculation
- Created buffer system using MPI commands for easy communication of border nodes between ranks
- Carried out further code optimisation using profilers and good programming practices

Physics Informed Neural Networks with DeepXDE and TensorFlow (Python) **2024**

- Developed a physics-informed neural network for solving advection-diffusion PDEs using TensorFlow-based DeepXDE
- Analysed PINN solutions with a custom finite difference method in Python
- Acquired skills in creating neural networks for approximating PDEs with ML packages

Finite Difference based solver for Maxwell's equations (Python) **2024**

- Created a Python code utilising NumPy and Matplotlib packages to create a finite difference based solver for Maxwell's equations
- Used efficient array slicing methods to perform fast FD calculations and generated detailed visualisations using Matplotlib's animation packages

Academic Engineering Projects

Modelling Flow around an Aerofoil – Awarded 64.00% **2024**

- Created a model of an aerofoil in Star-ccm+ and ran several CFD simulations with varying model parameters, using Java scripts for automation
- Ran similar simulations in Nektar++ to obtain data for comparison between star-ccm+ and high-fidelity methods
- Gained good experience of CFD model setup in Star-ccm+ and Nektar++
- Gained in-depth knowledge of various turbulence models, including Spalart–Allmaras, k–ε, and k–ω, with a focus on their distinct characteristics and applications

Structural Design of a deployable re-entry vehicle – Awarded 66.43% **2023**

- Developed a Matlab code to find optimum location of supports based on Euler beam theory
- Verified results of Matlab code using finite element simulations in Abaqus
- Learnt SimScape in a short period of time to develop a simulation of a 4-bar linkage
- Presented key findings to project supervisors during weekly meetings
- Produced a detailed design report, achieving a final grade of 66%

Work Experience

Tutor for Oxford Exchange Program - Baliol College **2024**

- Undertook a tutoring program to teach Chinese undergraduate students design principles of wind turbines
- Assisted students in learning principles such as Weibull distributions, aerofoil theory and blade element momentum theory as they created a design for a wind farm
- Practiced strong communication by effectively teaching difficult engineering concepts

Undergraduate Teaching Assistant at Imperial College London **2023**

- Collaborated with a team to facilitate Matlab sessions for a large group of students
- Demonstrated proficiency in Matlab and strong communication skills by explaining programming concepts in a clear and concise manner

Computer Vision and Machine Learning Intern at E-net Solutions (pvt) ltd **2023**

- Performed research on possible methods to create an affordable conveyor belt product counting system
- Trained a YOLOV8 AI model on a custom dataset, while optimising its performance by using quantisation and multiprocessing methods
- Led to a Python program that could process live video feeds on affordable CPUs

IT/Programming Skills

- Proficient in Matlab, Python and C++
- Intermediate knowledge of FORTAN
- Version control using Git
- Experienced user of Linux (Ubuntu) and bash for automation of Python and C++ scripts
- Project experience in Star-CCM+, Nektar++, ABAQUS and Solidworks (CAD)
- Good knowledge of the finite element libraries: Firedrake, FENICS (Python) and deal.II (C++)
- Proficient in Latex and Microsoft office applications.

Interests

- Current member of the Imperial Medics Squash team
- Volunteer for the charity "Sport4Health"