Azhar Gafoor CTP

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Education

Indian Institute of Science **Aug. 2022 – Ongoing**
PhD in Computational and Data Science. CGPA: 9.70 *Bangalore, KA, India*

Indian Institute of Technology Madras **Aug. 2020 – April 2022**
M. Tech in Thermal Engineering. CGPA: 9.79 *Chennai, TN, India*

College of Engineering, Trivandrum **Sep. 2011 – April 2015**
B. Tech in Mechanical Engineering. CGPA: 8.44 *Trivandrum, KL, India*

Achievements

- Secured All India Rank **565 (99.59 percentile)** out of 137826 in GATE 2020 conducted by IIT Delhi.
- Selected for the **Prime Minister's Research Fellowship (PMRF)** which is awarded to **3.5%** of the existing PhD student

Relevant Coursework

- Numerical Optimization
- Numerical Linear Algebra
- Environmental Data Analytics
- Non-Linear Model in Climate Sciences
- Environmental Fluid Dynamics
- Incompressible Fluid Flow
- Inverse Methods in Heat Transfer
- Micro & Nanoscale Energy Transport
- Numerical Methods in Thermal Engineering
- Foundation of CFD

Publications

A physics-informed neural network for turbulent wake simulations behind wind turbines. Physics of Fluids; 37 (1): 015110. 10.1063/5.0245113 2025
Gafoor CTP, A., Kumar Boya, S., Jinka, R., Gupta, A., Tyagi, A., Sarkar, S., Subramani, D.N.

On the Training Efficiency of Shallow Architectures for Physics Informed Neural Networks. Computational Science - ICCS 2024. Lecture Notes in Computer Science, vol 14834. 10.1007/978-3-031-63759-9_39 2024
Rishi, J., *Gafoor, A.*, Kumar, S., Subramani, D.

Experience

Bharat Petroleum Corporation Limited **June 2015 – March 2019**
Assistant Manager Operations *Belagavi, KA, India*

- Created an internal control of day-to-day transactions and punctually opened and closed business activities.
- Taught employees how to collaborate on daily tasks and achieve service targets. Effective time management reduced working hours by 20% and thereby eliminating overtime.
- Coordinated with engineering and projects (E&P) team to revamp 6 bay tank lorry filling gantry (TLFG) to 8 bay without affecting retail operations, and while upgrading tank farm and gantry automation by LnT.
- Helped a team of 20 maintain business professionalism by coaching each on methods for delivering exceptional service to every customer.
- Accomplished objectives by undertaking department activities during the absence of the line manager.
- Handled different work areas such as Maintenance, HSSE (Health, Safety, Security and Environment) and Planning & Supply.

Course Projects

Physics Informed Neural Networks(PINNs) to simulate fluid flows | *Python, Tensorflow, Keras* **IISc May 2023**

- PINNs model was developed to simulate laminar flow in a channel.
- The results show agreement with the analytical and CFD solution of Navier-Stokes equation for laminar channel flow.

Document Image Classification | *Python* **IISc Dec 2022**

- Two ML models, Convolutional Neural Network (CNN) and Logistic Regression (perceptron), were developed to classify images to 16 different classes using a train and test set of labelled 16000 images.
- CNN model gave a test accuracy of 72.27 %, whereas the logistic regression model gave 84.20%.

Numerical Solution for Lid Driven Cavity | *Python, Finite Difference Method* **IITM May 2021**

- Finite Difference Method (FDM) was used to solve benchmark lid-driven cavity problem and the accuracy of the method was validated using Ghia et al. data (1982).
- Analysed the contours of Pressure and Velocity, Streamlines for different Reynolds numbers.

Term Papers

- **Applications of Micro/Nano Fluidics in Energy Conversion**
- **Study On Lattice Boltzmann Method And High-Order Upwind Compact Finite-Difference LBM**

Projects

A Three-Dimensional Simulation of Non-Newtonian Blood Flow Through Irregular Arteries Using Off-Lattice Boltzmann Method | *Fortran, LBM* **June 2021 – May 2022**

- Developed off-lattice Boltzmann solver in three-dimensional cylindrical coordinates to simulate non-Newtonian blood flows under pulsatile conditions.
- Derived expression for non-Newtonian source term using Chapman-Enskog (CE) expansion.
- Validated the solver for shear thinning and thickening behaviour of blood using Power-law model.
- A model irregular stenosis is constructed using cosine and sine function to investigate the effect of various geometric and flow parameters on the blood flow dynamics under pulsatile inflow condition.
- Systematically investigated the effect of degree of surface irregularity of the stenosis and the shear-thinning effect of blood on the flow dynamics.

Vibrational Analysis of Flow Through Pipes | *ANSYS* **Aug. 2014 – April 2015**

- Determined the fundamental vibration frequency of viscoelastic polyurethane pipe without mass, with added mass, and with flow.
- Validated the analytical data and results obtained using ANSYS fluid-structure interaction simulation with that from the experimental data.

Technical Skills

Languages: Python, Fortran, C++, LaTeX
Developer Tools: VS Code, Google Cloud Platform
Technologies/Frameworks: Linux, GitHub, MATLAB, ANSYS Fluent, OpenFOAM, ParaView

Co-Curricular / Extracurricular

- Certification in 3-day Practical Fire Fighting training organized by Institute of Petroleum Safety, Health & Environment Management, ONGC, Goa from 18/01/2016 to 20/01/2016.
- Participated in a Glider Design and Fabrication Workshop organized by Aerotrix on 15/09/2012.
- Participated in the event 'Why Engineering?' at the annual technical fest Drishti '12 of College of Engineering, Trivandrum.