Parvez Ahmad

Mathematical Software Developer

Currently working as a Mathematical Software Developer in Sunrise Systems Limited, I am a dedicated and accomplished PhD graduate from IIT Delhi with over 7.5 years of academic and industrial expertise in developing numerical codes in Computational Fluid Dynamics and Computational Structural Mechanics. I am proficient in finite difference, finite volume, finite element and lattice Boltzmann methods. Adept in leveraging Fortran, C++, and other tools to develop, optimize and parallelize numerical codes. Familiar with open-source and commercial packages ANSYS Fluent, OpenFOAM and Abaqus CAE.

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Cambridge, United Kingdom

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EDUCATION

Doctor of Philosophy
Indian Institute of Technology Delhi
07/2017 - Present *9.31 DGPA*

Master of Technology
Aligarh Muslim University
07/2015 - 06/2017 *9.28 CPI (2nd Rank)*

Bachelor of Technology
Aligarh Muslim University
07/2011 - 06/2015 *8.92 CPI*

WORK EXPERIENCE

Mathematical Software Developer
Sunrise Systems Limited
12/2024 - Present *Cambridge, UK*

Tasks/Achievements

- Fixed ill-conditioned system bug in PIPENET, ensuring stable model solutions
- Enhanced pipe model accuracy by adding Bernoulli's velocity term
- Provided technical support, resolving PIPENET user issues

Senior Software Engineer
Tridiagonal Solutions Private Limited
06/2024 - 10/2024 *Pune, India*

Tasks/Achievements

- Optimized LBM-based codebase, enhancing simulation efficiency and stability
- Implemented MRT collision operator, improving hydrodynamic calculation accuracy
- Added Hershel-Bulkley model, expanding non-Newtonian fluid simulation capabilities

Senior Software Engineer
Hinduja Tech Limited
11/2023 - 05/2024 *Hyderabad, India*

Tasks/Achievements

- Managed CAE HPC and license servers, ensuring seamless operations
- Developed and tested software in Windows and Linux environments
- Created and optimized shell scripts, automating operational tasks

SKILLS

Visual Studio

Fortran

C++

GDB

MPI

OpenMP

CUDA

Git/GitHub

Lattice Boltzmann Method (LBM)

Finite Element Method (FEM)

Direct Numerical Simulation (DNS)

High Performance Computing

Linux/Bash

Vim

CMake

CODE DEVELOPMENT HIGHLIGHTS

Development of a finite-element solver for dynamic geometrically-nonlinear large deformation problems with non-uniform stiffness
Indian Institute of Technology, Delhi (PhD)
07/2017 - Present
github.com/theparvezahmad/nonLinSolid2D

Development of an MPI-parallel 3D fluid flow solver based on multiblock lattice Boltzmann method(LBM)
Indian Institute of Technology, Delhi (PhD)
07/2017 - Present
github.com/theparvezahmad/mbLBM3Dmpi

Turbulent drag reduction in a compressible channel flow
Aligarh Muslim University, Aligarh (MTech)
06/2016 - 06/2017
github.com/theparvezahmad/compChan3Dmpi

Development of a 2D cartesian code based on PVU-M scheme for compressible boundary layer
Aligarh Muslim University, Aligarh (BTech)
06/2014 - 06/2015
github.com/theparvezahmad/pvum2Dbl

ADDITIONAL PROJECTS

Numerical modelling of flow around a fixed circular cylinder employing the entropic lattice Boltzmann method with Grad's approximation
- github.com/theparvezahmad/cylELBM_Grad

Comparative analysis of parallel computing standards (MPI, OpenMP, CUDA) for accelerating Poisson solver performance
- github.com/theparvezahmad/poissonParallel

CFD simulation of an emptying tank in ANSYS Fluent using Volume-of-Fluid(VOF) method

OpenFOAM simulation of wind around buildings using k-Epsilon turbulence model and snappyHexMesh

Linear and nonlinear(material and geometric) analysis of a structure using ABAQUS CAE

Modeling a fluid-structure interaction containing two fluid phases in COMSOL Multiphysics

PUBLICATIONS

AIAA Scitech 2020 Forum
Improving resolution of three-dimensional lattice Boltzmann simulations using bicubic spline interpolation for moving boundaries
Author(s)
Parvez Ahmad, Manish Yadav, Nipun Arora and Amit Gupta
5th Jan 2020
https://doi.org/10.2514/6.2020-0342

SKILLS

Intel VTune/Advisor
VS Code
Python
Tecplot/Paraview
Latex
OpenFOAM
COMSOL Multiphysics
ANSYS Fluent
MATLAB
Abaqus CAE

COURSEWORK

Partial Differential Equations
Fluid Mechanics
Linear Algebra
Lattice Boltzmann Method
Computational Fluid Dynamics
Nonlinear Finite Element Method
Turbulence Modelling
Numerical Methods
Data Structures and Algorithms
Numerical Linear Algebra
Computational Geometry

LANGUAGES

English
Full Professional Proficiency