Zhi Shang, Ph.D.

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TX 77840

Qualifications:

- Experiences in CFD (computational fluid dynamics) and NHT (numerical heat transfer) over 15 years.
- Experiences in HPC (high performance computing) over 10 years.
- Parallel Programming using MPI, OpenMP, OpenACC and CUDA (GPUs), vectorization (MICs).
- Multiphase flow modeling of Mixture, Euler-Euler and Eulerian-Lagrangian approaches.
- Interface dynamics and phase change using VOF, Level Set and CLSVOF with heat transfer.
- Discrete phase modeling with DPM (discrete particle model) and DEM (discrete element method).
- Multi-physics simulations through FSI (fluid-structure interaction) and LBM (lattice Boltzmann method).
- Hypersonic (shock wave capture) and rarefied flows (3D DSMC-direct simulation Monte Carlo).

GitHub Master Repository Projects:

• CFD	Lattice Boltzmann method for computational fluid dynamics with BGK and MRT collision model	C++	https://github.com/zhishang72/OpenLBM
• MPI	Finite difference method for heat transfer with MPI-2 parallel I/O and MPI-3 neighborhood collectives	Fortran90	https://github.com/zhishang72/Heat
• Hybrid OpenMP/OpenACC/MPI	Hybrid OpenMP/MPI with OpenMP-2,3,4 under MPI thread initializing; Hybrid OpenACC/MPI with multi GPUs and OpenMP	C	https://github.com/zhishang72/MatrixMulMatrix
• Hybrid Cuda/MPI	Hybrid Cuda/MPI with non-shared and shared GPU memory usage	Cuda	https://github.com/zhishang72/MatrixMulMatrix_Cuda_MPI
• Python/OpenFOAM	Python picking up the residuals from OpenFOAM log output file and drawing the residual curves	Python	https://github.com/zhishang72/Python_OpenFOAM_process

Technical Skills:

- *Operating systems*: Linux, Windows
- *Website programming*: HTML, JavaScript, PHP
- *Parallel programming*: MPI, OpenMP, OpenACC and CUDA (GPUs), Vectorization (MICs)
- *High performance computing*: Valgrind, Perf, IPM, VTune, TAU, TotalView
- *Scientific computational languages*: C++, C, Fortran, Matlab, Python
- *Software for engineering applications*:
  CAD geometry tool: Solidworks, CATIA, Unigraphics, AutoCAD, Salome, Blender
  CFD pre-processing tool: ICEM-CFD, snappyHexMesh, Gridgen, Salome, GiD, Gmsh
  CFD solver tool: OpenFOAM, FLUENT, CFX, STAR-CD, STAR-CCM+, Code_Saturne, Telemac
  CFD post-processing tool: Paraview, Tecplot, EnSight, FieldView, VisIt, Maya, Blender, Matplotlib

Educations:

- Undergraduate: Xi'an Jiaotong University, Xi'an, China, Thermal Engineering, BS, 1989-1993.
- Post graduate: Xi'an Jiaotong University, Xi'an, China, Thermal Engineering, MS, 1993-1996.
- Post graduate: Xi'an Jiaotong University, Xi'an, China, Nuclear Engineering, PhD, 1996-2000.
- Post-Doc: Tsinghua University, Beijing, China, Thermal Engineering, 2001-2003.

Professional Work Experiences:

- *Research Associate, HPRC, TAMU, USA, July 2016-December 2017:*
  high performance computing (HPC) at Intel Xeon Phi Knights Landing Cluster (KNL) using OpenFOAM (C++);
  coupling DPM and DEM with VOF for multiphase flow using OpenFOAM (C++);
  DPM and DEM modeling for porous media based on OpenFOAM (C++);
  OpenFOAM for complex fluid flow with GPU application (C++).
- *Research Associate, CCT, LSU, USA, March 2015-June 2016:*
  high performance computing (HPC) at Intel Xeon Phi Coprocessors (KNC) using OpenFOAM (C++);
  DPM and DEM modeling for porous media based on OpenFOAM (C++);
  OpenFOAM for complex fluid flow with GPU application (C++).
- *Scientist III, IHPC, A-STAR, Singapore, October 2011-February 2015:*
  parallelizing and optimizing OpenFOAM for dealing with large scale high performance computing (C++);
  parallelizing and optimizing 3D CFD codes of VOF, level set and CLSVOF for multiphase flows (C++ and Fortran);
  parallelizing and optimizing 3D LBM code for multiphase flows (C++, Fortran and Matlab);
  Lagrangian algebraic slip mixture model for multiphase flows;
  interface dynamics of multiphase flows;
  OpenFOAM for complex fluid flows (C++).
- *Computational Scientist, Daresbury Laboratory, STFC, UK, April 2009-September 2011:*
  research and development on large scale CFD parallel computing program towards the Exascale (C and Fortran);
  research and development on supercavitation around high speed submarine using OpenFOAM (C++);
  hybrid MPI and OpenMP parallel CFD programming for finite element method (Fortran);
  complex fluid flow using OpenFOAM on chemical reactions and combustions (C++);
  research and development on hypersonic rarefied flows using OpenFOAM (C++).
- *Research Associate, Aeronautical Engineering, Kingston University London, UK, December 2007-March 2009:*
  in-house hypersonic CFD code development for LES and DNS with MPI (Fortran);
  CFD with heat transfer of supercritical pressurized water (SCWR) (Fortran).
- *Collaborative Researcher, Aeronautics, Astronautics and Computational Engineering Unit, Faculty of Engineering and the Environment, University of Southampton, UK, December 2007-March 2009:*
  developing compressible CFD code (SBLI) on DNS and LES for hypersonic flows (Fortran).
- *Visiting Fellow, Aeronautical Engineering, Kingston University London, UK, February 2007-November 2007:*
  development of novel drift-flux model for two-phase flows (C and C++);
  teaching assistant on CFD (Matlab and Fortran).
- *Research Fellow, Nuclear Professional School, University of Tokyo, Japan, March 2006-February 2007:*
  CFD on aided design of supercritical pressurized water-cooled fast nuclear reactor (SWFR).
- *Part-time CFD Engineer, ANSYS CFX-China, Shanghai, China, March 2005-March 2006:*
  research and application of CFD (C++ and Fortran).
- *Associate Professor, School of Nuclear Science and Engineering, Shanghai Jiaotong University, China, June 2003-December 2008:*
  teaching and research (Matlab, Fortran, C and C++).
- *Postdoctoral Research Fellow, Department of Thermal Engineering, Tsinghua University, China, May 2001-May 2003:*
  multiphase flow modeling and code developing (C and C++).
- *Research Assistant, Department of Nuclear Engineering, Xi'an Jiaotong University, China, August 2000-April 2001:*
  nuclear reactor thermal dynamics computing (Matlab, Fortran, C and C++).

Publications:

- *Journals (42 papers); Conferences (30 presentations and articles); Books (1 book)*

https://www.researchgate.net/profile/Zhi_Shang/contributions