Zongze Li

CONTACT

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: Personal Page

: LinkedIn

: Google Scholar

: GitHub

SKILLS

Simulation/Modeling:

ANSYS, COMSOL, FLUENT, Palabos
Computational Fluid Dynamics (CFD),
Finite Element Method (FEM),
Fluid-Structure Interaction (FSI),
Lattice Boltzmann Method (LBM)

Programming:

Algorithm Development, C++, HTML, JAVA, Linux, Microsoft Visual Studio, MATLAB, Python, Message Passing Interface (MPI)

CAD/Software:

Adobe, AutoCAD, Blender, ImageJ, MeshLab, Paraview, SolidWorks

Laboratory:

2D Laser Cutting, 3D Printing, Particle Image Velocimetry (PIV)

SUMMARY

Ph.D. in Mechanical and Aerospace Engineering at the University of South Florida with extensive expertise in **CFD**, **FSI**, **LBM**, and **coding**. Developed advanced **C++/MPI** algorithms and solvers in **HPC** environments with high accuracy and stability, including applications in patient-specific hemodynamic and marine animal swimming modeling. Skilled in **multi-physics simulation**, **algorithm development**, and data visualization using **ANSYS**, **Palabos**, **MATLAB**, **ParaView**, and other tools. Proven track record as a peer reviewer, conference presenter, and invited speaker, with a strong focus on bridging advanced numerical modeling with practical biomedical and engineering applications.

PROJECTS

Bio-Inspired CFD: Fluid-Structure Interaction (FSI) Modeling of a Marine Animal (2022-Now)

Developed a high-fidelity **FSI** framework using **LBM**, including a **custom C++ code** powered solver package parallelized with **MPI** in **HPC** (**Linux Rad Hat**) environment. The solver was validated against analytical solutions and optimized for computational efficiency with less than 1% error. Research outcomes are under final revision for journal publication.

Boundary Algorithm Improvements for Lattice Boltzmann Method (2022-Now)

Developed two novel **C++ algorithms** to achieve off-lattice Dirichlet pressure boundary conditions in **LBM**, incorporating **MPI** for parallel computing in **HPC** (**Linux Red Hat**) environment. This project achieved reduced error and improved stability over existing approaches. The work is currently undergoing final revisions for journal publication.

Patient-Specific Aortic Flow CFD Modeling using LBM Coupled with Windkessel Model (2019-2022)

Performed patient-specific aortic flow simulations using **LBM**, integrating Windkessel boundary conditions to achieve physiologically realistic outflow. Achieved <5% error and generated high-resolution clinical flow images with potential diagnostic applications. Tools included **Palabos** (**C++**), **Blender**, **MeshLab**, **ParaView**, and **MATLAB**. This work has been published.

Thesis Projects:

Design and Testing of Experimental Langmuir Turbulence Facilities (ANSYS FLUENT, 2018-2019)
Thermal Environment Analysis and Optimization in PC Chassis (ANSYS FLUENT, 06/2015)

Course Projects:

CFD Modeling of Air Circulation by Ceiling Fan (ANSYS FLUENT, 04/2021)
6-DOF Robotic Arm Design (AutoCAD & MATLAB, 04/2018)

EXPERIENCE

Peer Reviewer for Physics of Fluids and CFD Letters (2024-Now)
Publication in Computers & Fluids (06/2023)
Invited Speaker, U.S. Education without Borders (03/2022)
Academic Conference (FFS) Presenter (05/2022 05/2023 05/2024 05/2025)
Academic Conference (APSDFD) Presenter (11/2021 11/2022)
Academic Conference (DCB-DVM) Poster (11/2021)
Research Assistant, University of South Florida (2019-Now)
Teaching Assistant, University of South Florida (2019-Now)

EDUCATION

Ph.D. in Mechanical Engineering at University of South Florida, Tampa, FL (2019-Now, GPA: 3.96)

Courses: Computational Fluid Dynamics, Advanced Computational Fluid Mechanics, Biological Fluid Mechanics, Engineering Physiology, etc.

M.S. in Mechanical Engineering at University of South Florida, Tampa, FL (2017-2019, GPA: 3.95)

Courses: Advanced Fluid Mechanics, Advanced Engineering Math II, Advanced Materials, Advanced Mathematics, Applied Elasticity, Robotic Systems, Finite Element Methods, etc.

B.Eng. in Renewable Energy at University of Shanghai for Science and Technology, Shanghai, China (2011-2015, GPA: 3.21)

Courses: Introduction to Computer Science, Images Processing and Creation (Adobe), Mechanical Engineering Drawing, Computer Drawing (AutoCAD), Advanced Computer Language (C), General Chemistry, Linear Algebra, Experiments of Electronics, Engineering Fluid Mechanics, Engineering Thermodynamics, Heat Transfer, Refrigeration Principles, Physics, etc.