Ze Zhao

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https://scholar.google.com/citations?user=uenziSgAAAAJ&hl=en

Urbana, Illinois 61801

Objective

I write highly optimized finite element code on CPU and GPU.
I am seeking a full-time research and development engineer position to leverage my expertise in computational mechanics and contribute to the intersection of high-performance computing (HPC) and finite element analysis (FEA).

Education

- **University of Illinois Urbana-Champaign** — *2019–2025*
  Department of Civil and Environmental Engineering — PhD in Civil Engineering
- **Peking University** — *2013–2017*
  College of Engineering — BS in Theoretical and Applied Mechanics

Skills

- **Programming Languages:** C, C++, CUDA, Fortran, Python, Matlab, Bash
- **Open-source Packages:** MPI, PETSc, hypre, FEniCS
- **Pre/post-processing Tools:** Gmsh, METIS, Paraview, Tecplot

Selected Research Projects

- **CFD Study of Thermal Multiphase Flow in Direct Energy Deposition: Metallic Powder Generation**
  - Developed a novel high-fidelity CFD tool to optimize the vibration frequency and magnitude of ultrasonic atomization to produce high-quality powders for metal AM application
- **CFD Study of Thermal Multiphase Flow in Direct Energy Deposition: Manufacturing Process**
  - Implemented an efficient two-phase simulation tool to optimize the laser operation coefficients to enhance mechanical performance
- **Enriched Immersed Boundary method in Conjugate Heat Transfer Problems**
  - Proposed a method for solution representation in immersed boundary method with property discontinuity
  - Derived an interfacial coupling method for temperature and flux compatibility
  - Demonstrated accuracy on the benchmark fluid problems
  - Demonstrated flexibility using moving structures with complex geometry
- **Overset Method for Water Quenching Problems**
  - Developed a thermofluid toolkit with phase transition for quenching problems
  - Proved the convergence of Dirichlet-Dirichlet coupled overset method in advection-diffusion systems using stabilized FEM
  - Demonstrate the advantage in terms of accuracy and flexibility over conventional HTC methods
- **Thermal Prediction in Manufacturing Composited Material via CFD and Physical-informed Machine Learning**
  - Developed a physics-based high-fidelity temperature predictor applicable to various manufacturing scenarios without tedious parameter tuning work of traditional empirical methods
  - Implemented a reduced order model using physics-informed machine learning for temperature prediction and combined with FEA tools for elasticity analysis

Honors and Awards

- **Burton & Erma Lewis Teaching Assistant** *2022*
  University of Illinois Urbana-Champaign
- **Lewis Fellowship** *2019*
  University of Illinois Urbana-Champaign
- **May 4th Scholarship** *2015*
  Peking University