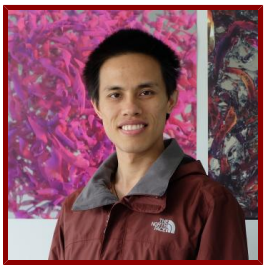
Stanford



Lin Fu

Postdoctoral Research Fellow, Mechanical Engineering

Bio

BIO

Dr.-Ing. Lin Fu is a postdoctoral fellow of CTR working with Prof. Parviz Moin at Stanford University. Before he joined CTR, he did postdoctoral research with Professor N.A. Adams in Technical University of Munich. In the same institute, he obtained his Ph.D. degree with a grade of Summa Cum Laude. He develops new numerical methods including the high-order TENO (targeted ENO) schemes for hyperbolic conservation laws, the CVP and SPH based domain decomposition method, SPH method and mesh generation method. He is interested in multiphase flows, MHD flows and turbulence. Recently, he is working on hypersonic flows by Direct Numerical Simulation (DNS) and Large Eddy Simulation (LES) approach. He has published more than 20 journal papers on prestigious journals, e.g. journal of computational physics, Computer Methods in Applied Mechanics and Engineering, computer physics communications etc.

HONORS AND AWARDS

- National scholarship, Chinese Ministry of Education (2008-2009)
- Summa cum laude (passed with highest distinction) of Ph.D thesis, Technical University of Munich (2017-10-05)
- CTR postdoctoral fellowship, Center for Turbulence Research, Stanford University (2018-2020)

PROFESSIONAL EDUCATION

- Ph.D, Technical University of Munich , Fluid Mechanics (2017)
- Master of Science, Northwestern Polytechnical University , Fluid Mechanics (2013)
- Bachelor of Science, Northwestern Polytechnical University , Engineering (2010)

LINKS

- My home page: https://sites.google.com/site/linf1017/home
- ORCiD: https://orcid.org/0000-0001-8979-8415
- My researchgate: https://www.researchgate.net/profile/Lin_Fu7
- My linkedin: https://www.linkedin.com/in/lin-fu-%E5%82%85%E6%9E%97-11230750/
- Research homepage: https://linfuturbulence.wixsite.com/linfu

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Turbulence and modeling

• Incompressible and compressible wall-bounded turbulence.

• Isotropic turbulence and shock-turbulence interaction.

• Subgrid-scale (SGS) model.

• Wall-modeled large-eddy simulation.

• Shock-boundary-layer interaction.

• Shock-induced transition.

• Flow stability.

High-order numerical scheme for conservation laws

• Novel high-order TENO schemes (targeted ENO) for hyperbolic conservation laws.

• Low-dissipation low-dispersion optimal finite-difference schemes.

• Novel implicit large eddy simulation(ILES) model.

• New TENO reconstruction framework.

Interface tracking method for multi-phase flow

• Multi-scale and multi-resolution simulations.

• Low-dissipation numerical approach for level-set based interface advection.

• Explicit reinitialization and extending algorithm for level-set function.

• Compressible multi-phase flow simulations based on sharp interface method.

Smoothed-particle hydrodynamics (SPH) method

• Numerical discretization algorithms for SPH method.

• Large-scale simulation framework for SPH method.

Partitioning and domain decomposition methods

• Novel physics-driven SPH based partitioning method for Adaptive Mesh Refinement (AMR) mesh.

• Novel Centroidal Voronoi Particle (CVP) based domain decomposition method.

• Large-scale parallelization algorithms for the partitioning method.

Unstructured mesh generation

• Novel SPH based isotropic and anisotropic unstructured mesh generation.

• Novel CVP based mesh generation.

• Multi-material/regional unstructured mesh generation.

• Partitioning and parallel algorithms for adaptive unstructured mesh.

RANS methodology for aerodynamics

• CPU and GPU based parallel multi-block flow solvers for complex geometries, e.g. aircraft.

• High-resolution numerical methods, e.g. Riemann solver and reconstruction schemes.

• State-of-the-art turbulence models for engineering problems.

Publications

PUBLICATIONS

- **A Lagrangian Inertial Centroidal Voronoi Particle method for dynamic load balancing in particle-based simulations** *Computer Physics Communications*
  Ji, Z., Fu, L., Hu, X., Adams, N.
  2019; 239: 53-63

- **Improved Five- and Six-Point Targeted Essentially Nonoscillatory Schemes with Adaptive Dissipation** *AIAA Journal*
  Fu, L., Hu, X., Adams, N.
  2019; 57 (3): 1143-1158

- **A new multi-resolution parallel framework for SPH** *Computer Methods in Applied Mechanics and Engineering*

Ji, Z., Fu, L., Hu, X., Adams, N.
2019; 346: 1156-1178

- **A low-dissipation finite-volume method based on a new TENO shock-capturing scheme** *Computer Physics Communications*
  Fu, L.
  2019; 235: 25-39
- **High-order low-dissipation targeted ENO schemes for ideal magnetohydrodynamics** *Journal of Scientific Computing*
  Lin, F., Qi, T.
  2019
- **Detonation Simulations with a Fifth-Order TENO Scheme** *Communications in Computational Physics*
  Dong, H., Fu, L., Zhang, F., Liu, Y., Liu, J.
  2019; 25 (5)
- **Parallel fast-neighbor-searching and communication strategy for particle-based methods** *Engineering Computations*
  Fu, L., Ji, Z., Hu, X., Adams, N.
  2019
- **A hybrid method with TENO based discontinuity indicator for hyperbolic conservation laws** *Communications in Computational Physics*
  Fu, L.
  2019; 26: 973-1007
- **A very-high-order TENO scheme for all-speed gas dynamics and turbulence** *Computer Physics Communications*
  Fu, L.
  2019; 244: 117-131
- **An optimal particle setup method with Centroidal Voronoi Particle dynamics** *Computer Physics Communications*
  Fu, L., Ji, Z.
  2019; 234: 72-92
- **A targeted ENO scheme as implicit model for turbulent and genuine subgrid scales** *Communications in Computational Physics*
  Fu, L., Hu, X., Adams, N.
  2019; 26: 311-345
- **An isotropic unstructured mesh generation method based on a fluid relaxation analogy** *Computer Methods in Applied Mechanics and Engineering*
  Fu, L., Han, L., Hu, X., Adams, N.
  2019; 350C: 396-431
- **Adaptive anisotropic unstructured mesh generation method based on uid relaxation analogy** *Communications in Computational Physics*
  Fu, L., Hu, X., Adams, N.
  2019
- **A new class of adaptive high-order targeted ENO schemes for hyperbolic conservation laws** *Journal of Computational Physics*
  Fu, L., Hu, X., Adams, N.
  2018; 374: 724-751
- **A physics-motivated Centroidal Voronoi Particle domain decomposition method** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Fu, L., Hu, X. Y., Adams, N. A.
  2017; 335: 718-735
- **Single-step reinitialization and extending algorithms for level-set based multi-phase flow simulations** *Computer Physics Communications*
  Fu, L., Hu, X., Adams, N.
  2017; 221: 63-80
- **A novel partitioning method for block-structured adaptive meshes** *Journal of Computational Physics*
  Fu, L., Litvinov, S., Hu, X., Adams, N.
  2017; 341: 447-473
- **Targeted ENO schemes with tailored resolution property for hyperbolic conservation laws** *Journal of Computational Physics*
  Fu, L., Hu, X., Adams, N.

2017; 349: 97-121

- **A family of high-order targeted ENO schemes for compressible-fluid simulations** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Fu, L., Hu, X. Y., Adams, N. A.
  2016; 305: 333-359

- **A multi-block viscous flow solver based on GPU parallel methodology** *COMPUTERS & FLUIDS*
  Fu, L., Gao, Z., Xu, K., Xu, F.
  2014; 95: 19-39