Chenguang Zhang

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Education

Ph.D. in Engineering Science, Louisiana State University (LSU), U.S.	Jun. 2012—Aug. 2017
M.S. in Computer Science, LSU, U.S.	Jan. 2016—Aug. 2017
M.S. in Physical Oceanography and Coastal Science, LSU, U.S.	Aug. 2009—Jun. 2012
B.S. in Physical Geography, Nanjing University, China	Sept. 2005—Jun. 2009

Experience

Polytechnique Montréal, Department of Chemical Engineering, Postdoctoral Researcher 2020.09—
Supervisor: Jamal Chaouki

- Design and simulation of effective T-junction fluid mixer
- Mathematical modeling and simulation of the heap leaching mining process

MIT, Department of Mathematics, Postdoctoral Research Associate 2019.01—2020.09
Supervisor: Laurent Demanet and Philippe Ricoux

- Mathematical modeling of crude refinery and fast mixed-integer nonlinear optimization
- Stability analysis of multiple fluid-structure interaction configurations
- Simulation of fog harvesting using wavy cylinders (with Dr. PA Zhu)

LSU, Department of Chemical Engineering & CCT, Postdoctoral Researcher 2017.08—2018.12
Supervisor: Krishnaswamy Nandakumar

- Design of toroidal helical mixer with improved mixing and heat transfer efficiency
- Studied the dynamic effects of different particle arrangements in a lid-driven cavity

LSU, Department of Chemical Engineering, Research Assistant 2012.06—2017.08

- Asymptotic theory of channel flows induced by temperature waves
- Design of accurate geometric algorithms using signed distance field
- Implementation of immersed boundary method based on OpenFOAM
- Discrete particle-immersed boundary simulation of solid-particle-fluid systems
- Experiment and simulation of granular media in a lid-driven cavity

ANSYS INC, Research Staff Intern 2014.06—2014.08

- Implementation of turbulent immersed boundary code in ANSYS Fluent
- Implementation of in-memory communication of ANSYS Aqwa and ANSYS Fluent
- Coupled simulation of water entry of undersea structures

LSU, Department of Computer Science, Research Assistant 2016.01—2017.08

- All-quad mesh generation by molecular dynamics of charged particles

LSU, Department of Oceanography & Coastal Sciences, Research Assistant 2009.08—2012.06

- Parallelization of pressure forcing in the Finite Volume Community Ocean Model
- Study of the effect of hurricane trajectory and traveling speed on storm surge

Research Interests

Multiphase fluid mechanics, computational fluid dynamics, immersed boundary method, fluid-structure interaction, granular media, discrete element method.

Publications

Journal Articles

1. **C. Zhang**, Andrew N. Okafor, Hiba Malik, K.D.P. Nigam, K.Nandakumar (2021). Improved Mass Transfer Performance of Membrane units in a Toroidal Helical Pipe—reduction of concentration polarization by secondary flows, *Chemical Engineering and Processing - Process Intensification*. **In press**.
2. **C. Zhang** (2021). Fluid-structure interaction in rectilinear flows: four analytical solutions, *Physics of Fluids*. **33** (6), 063611
3. Z. Ding, SS. Tiwari, **C. Zhang**, M. Tyagi, B. Kong, K. Nandakumar, JB. Joshi (2021). Further contributions to the dynamics of a freely rotating elliptical particle in shear flow, *The Canadian Journal of Chemical Engineering*.
4. **C. Zhang** (2020). sdfibm: a signed distance field based discrete forcing immersed boundary method in OpenFOAM, *Computer Physics Communications*. **255**, 107370
5. **C. Zhang** and K. Nandakumar (2019). Enhancement of heat transfer in laminar flows using a toroidal-helical pipe, *Industrial & Engineering Chemistry Research*. **59** (9), 3922-3933
6. **C. Zhang**, C. Wu, and K. Nandakumar (2019). Effective geometric algorithms for immersed boundary method using signed distance field, *ASME Journal of Fluids Engineering*. **141** (6)
7. **C. Zhang**, A. R. Ferrell, and K. Nandakumar (2019). Study of a toroidal-helical pipe as an innovative static mixer in laminar flows, *Chemical Engineering Journal*. **359**, 446-458
8. **C. Zhang** and C. Li (2019). Effects of hurricane forward speed and approach angle on storm surge: an idealized numerical experiment, *Acta Oceanologica Sinica*. **38** (7), 48-56
9. **C. Zhang** and K. Nandakumar (2018). Approaches to the numerical estimates of grid convergence of NSE in the presence of singularities, *International Journal of Nonlinear Sciences and Numerical Simulation*. **19**, 281-287
10. **C. Zhang**, H. Wong, and K. Nandakumar (2018). Axial flow in a 2D microchannel induced by a traveling temperature wave imposed at the bottom wall, *Journal of Fluid Mechanics*. **848**, 1040-1072
11. **C. Zhang** and X. Li (2017). Automatic quad meshing by simulating NaCl crystallization, *Procedia Engineering* (presented at International Meshing Roundtable). **203**, 284-296

Preprints

1. **C. Zhang** (2020). The optimal way of folding a bond notebook page into a bookmark (reported by Popular Mechanics magazine), https://arxiv.org/abs/2002.02622.
2. **C. Zhang** (2020). A geometric interpretation of the quadratic formula, https://arxiv.org/abs/2001.02729.