Xingyu Su

Personal Info

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Education

2022/03-PRESENT	**Unveristy of Sydney**, Sydney, NSW, Australia Visiting Ph.D. in School of Aerospace Mechanical & Mechatronic Enginnering
2019/09-PRESENT	**Tsinghua Unveristy**, Beijing, P.R. China Ph.D. candidate in Center for Combustion Energy
2018/07-2018/08	**Duke Univeristy**, Durham, NC, USA Research intern in Department of Mechanical Engineering and Materials Science
2015/09-2019/07	**Tsinghua Unveristy**, Beijing, P.R. China Undergratuate major in Department of Energy and Power Engineering Undergratuate minor in Computer Technology and Application

Research Experience

2022/02-PRESENT	*Subject*:	Uncertainty quantification of sooting flames
	Advisor:	Prof. Assaad Masri, University of Sydney Prof. Matt. Cleary, University of Sydney
	Keyword:	Soot formation; Sensitivity analysis; Uncertainty quantification
2021/09-2022/05	*Subject*:	A pairwise mixing model with kernel constraint
	Advisor:	Prof. Zhuyin Ren, Tsinghua University
	Keyword:	Transported PDF method; DNS; Turbulent combustion
2020/03-2022/01	*Subject*:	Kinetic parameter optimization via Neural ODE
	Advisor:	Prof. Zhuyin Ren, Tsinghua University
	Keyword:	Neural networks; Kinetics mechanism; Parameter optimization
2018/11-2020/05	*Subject*:	Uncertainty analysis in mechanism reduction
	Advisor:	Prof. Zhuyin Ren, Tsinghua University
	Keyword:	Mechanism reduction; Uncertainty quantification; Active subspace
2018/07-2018/08	*Subject*:	Image processsing based droplet sorter
	Advisor:	Prof. Tony Jun Huang, Duke Univeristy
	Keyword:	Real-time image processing; Droplet tracking; Experiment

Publications

1. **X. Su**, M.J. Cleary, H. Zhou, Z. Ren, A.R. Masri. Uncertainty analysis of soot formation in laminar flames simulated with a sectional method, Combustion and Flame, under review.

2. **X. Su**, J. Wei, E.R. Hawkes, H. Zhou, Z. Ren. A pairwise mixing model with kernel constraint and its appraisal in transported PDF simulations of ethylene flames, Combustion and Flame, under review.

3. **X. Su**, M.J. Cleary, H. Zhou, Z. Ren, A.R. Masri. Uncertainty analysis of soot formation in a burner stabilized stagnation flame, Asia-Pacific Conference on Combustion, 2023, accepted.

4. M. Zhou, W. Chen, **X. Su**, C.L. Sung, X. Wang, Z. Ren. Data-driven modelling of general fluid density under subcritical and supercritical conditions, AIAA Journal, 2023, in press.

5. X. Wang, J. Wei, **X. Su**, H. Zhou, Z. Ren. Investigation of reaction-induced subgrid scalar mixing in LES/FDF simulations of turbulent premixed flames, Physical Review Fluids, 2022, 7 (12) : 124603, [link].

6. J. Wei, **X. Su**, E.R. Hawkes, H. Zhou, Z. Ren. Assessment of critical species for differential mixing in transported PDF simulations of a non-premixed ethylene DNS flame, Combustion and Flame, 2022, 224 : 112240, [link].

7. W. Ji, **X. Su**, B. Pang, Y. Li, Z. Ren, S. Deng. SGD-based optimization in modeling combustion kinetics: Case studies in tuning mechanistic and hybrid kinetic models, Fuel, 2022, 324 : 124560, [paper].

8. **X. Su**, W. Ji, J. An, Z. Ren, S. Deng C. K. Law. Kinetics parameter optimization of hydrocarbon fuels via neural ordinary differential equations, Combustion and Flame, under review, [preprint].

9. J. Wei, **X. Su**, X. Wang, H. Zhou, E. R. Hawkes, Z. Ren. A mixing timescale model for differential mixing in transported probability density function simulations of turbulent non-premixed flames, Physics of Fluids, 2022, 34 (6) : 067122 [link].

10. L. Zhang, **X. Su**, H. Zhou, X. Wang, Z. Ren. Active Control of Multiple Neural Networks for Oscillating Combustion, AIAA Journal, 2022, 60(6): 3821-3833, [paper].

11. **X. Su**, W. Ji, L. Zhang, W. Wu, Z. Ren, S. Deng. Neural differential equations for inverse modeling in model combustors,, ASME IMECE, 2021, paper 69657, [paper].

12. W. Ji, **X. Su**, B. Pang, S. J. Cassady, A. Ferris, Y. Li, Z. Ren, S. Deng, Arrhenius.jl: A Differentiable Combustion Simulation Package, arXiv:2107.06172, [preprint].

13. N. Wang, Q. Xie, **X. Su**, Z. Ren. Active Subspace Methods for the Analysis and Optimization of Turbulent Combustion, Acta Aeronautica et Astronautica Sinica, 2021, 42:625228 (in Chinese), [paper].

14. **X. Su**, W. Ji, Z.Ren. Uncertainty analysis in mechanism reduction via active subspace and transition state analyses, Combustion and Flame, 2021, 227:135-146, [paper], [code].

15. H. Zhu, P. Zhang, Z. Zhong, J. Xia, J. Rich, J. Mai, **X. Su**, Z. Tian, H. Bachman, J. Rufo, Y. Gu, P. Kang, K. Chakrabarty, T.P. Witelski, T.J. Huang, Acoustohydrodynamic tweezers via spatial arrangement of streaming vortices. Science Advances, 2021, 7(2):eabc7885, [paper].

16. N. Wang, Q. Xie, **X. Su**, Z. Ren. Quantification of modeling uncertainties in turbulent flames through successive dimension reduction, Combustion and Flame, 2020, 222:476-489, [paper].

17. P. Zhang, W. Wang, H. Fu, J. Rich, **X. Su**, H. Bachman, J. Xia, J. Zhang, S. Zhao, J. Zhou, T.J. Huang. Deterministic droplet coding via acoustofluidics, Lab on a chip, 2020, 20(23):4466-4473, [paper].

18. P. Zhang, C. Chen, **X. Su**, J. Mai, Y. Gu, Z. Tian, H. Zhu, Z. Zhong, H. Fu, S. Yang, K. Chakrabarty, T.J. Huang. Acoustic streaming vortices enable contactless, digital control of droplets, Science Advances, 2020, 6(24):eaba0606, [paper].

Work Experience

2017/07-2017/08   Hesai Photonics Technology, work as intern in hardware department

Abilities and Skills

Program: C / C++ / Python / Fortran / Rust / JavaScript
Software: Matlab / Fluent / Solidworks / AutoCAD
Hardware: Arduino / Raspberry PI

Honors and Awards

2022/12	Best Paper Award of China National Symposium on Combustion, China
2017/11	National First Prize of China Undergraduate Mathematical Contest in Modeling, China
2017/10	Scholarship for Technology Innovation Excellence, Tsinghua University
2017/04	Third Prize of 35th Challenge Cup, Tsinghua University

Extracurricular Activities

2019/07-2020/07	**Club Leader** at Skyworks Club, Tsinghua University

Hobbies

Roller Skating, Skating, Skiing, Swiming