Maochao XIAO

Tsinghua University, Beijing, China
+86 18810378860 maochao_xiao@outlook.com

EDUCATION

Northwestern Polytechnical University, China 2012-2016
- Bachelor of Engineering, English Elite Class in Flight Vehicle Propulsion Engineering
- Major GPA: 91.35/100, Overall GPA: 90.42/100, Ranking: 1/131

Tsinghua University, China 2016-2019
- Master of Engineering, School of Aerospace Engineering
- Major GPA: 3.74/4.0, Overall GPA: 3.66/4.0

Tsinghua University, China 2019-Now
- Research assistant, Lab of Advanced Simulation of Turbulence (LAST)
- Advisors: Prof. Yufei Zhang, Haixin Chen, Song Fu

RESEARCH EXPERIENCE

Development of IDDES with Anisotropic Minimum Dissipation SGS Modeling 2021-Now
- Developed an enhanced IDDES method with anisotropic minimum dissipation subgrid stress modeling (AMD-IDDES), suitable to use on anisotropic grids and in the flows where the "grey area" issue is severe and free-shear-layer transition exists
- Validated the method via canonical test cases and iced airfoil/wing flows

Numerical Study of Iced Wing Flows 2021-Now
- Studied the aerodynamic effects of horn and streamwise ice on wings via AMD-IDDES
- Analyzed the effects of wing tip vortex and end-wall interactions

Assessment of SST-IDDES with a Shear-Layer-Adapted Subgrid Length Scale 2017-2020
- Combined the SST-IDDES with a shear-layer-adapted subgrid length scale to address the "grey area" issue
- Validated the method via canonical test cases and iced airfoil/wing flows

Numerical Study of Iced Airfoil Flows 2016-2020
- Studied the aerodynamic effects of horn, streamwise and ridge ice on (multi-element) airfoils via wall-modeled LES and AMD-IDDES
- Extracted the dominant flow structures via proportional orthogonal decomposition (POD)
- Analyzed the vortex motions in the ice-induced separated shear layers and acoustic resonance around the iced slat

Development of Reduced-Order Finite Difference Method 2015-2016
- Developed a reduced-order finite difference method based on POD technique to accelerate the solving of the NS equations by two orders of magnitude
- Validated the reduced-order method via a laminar backward-facing step flow and cavity flow

Development of Mathematical Models for Real-Life Problems 2013-2016
- Competed in national and international mathematical contests in modelling
- Grading papers in the first round of the 8th MathorCup Mathematical Contest and in the 8th Asia Pacific Mathematical Contest

JOURNAL PUBLICATIONS

1. M. Xiao, Y. Zhang. "A New Detached Eddy Simulation Approach with Anisotropic Subgrid Stress modeling and Its Applications in Separated Iced Wing Flow Prediction". (drafting)
2. M. Xiao, Y. Zhang, and F. Zhou. "Enhanced Prediction of Three-dimensional Finite Iced Wing Separated Flow Near Stall," *Journal of Aircraft*, 2022. (under review)

3. M. Xiao, and Y. Zhang. "Improved Prediction of Flow Around Airfoil Accreted with Horn or Ridge Ice," *AIAA Journal*, Vol. 59, No. 6, 2021, pp. 2318-2327.
4. M. Xiao, Y. Zhang, and F. Zhou. "Numerical Investigation of the Unsteady Flow Past an Iced Multi-Element Airfoil," *AIAA Journal*, Vol. 58, No. 9, 2020, pp. 3848-3862.
5. M. Xiao, and Y. Zhang. "Assessment of the SST-IDDES with a Shear-Layer-Adapted Subgrid Length Scale for Attached and Separated Flows," *International Journal of Heat and Fluid Flow*, Vol. 85, 2020.
6. M. Xiao, Y. Zhang, H. Chen, and F. Zhou. "Numerical Study of Iced Airfoils with Horn Features using Large-Eddy Simulation," *Journal of Aircraft*, Vol. 56, No. 1, 2019, pp. 94-107.
7. H. Chen, Y. Zhang, Z. Li, and M. Xiao**.** NSAWET, Version 1.1. (software copyright)

CONFERENCE PUBLICATIONS

8. M. Xiao, Y. Zhang, and H. Chen. "Development of Shear-Layer-Adapted Sub-grid length Scale for SST-IDDES," 10th International Conference on Computational Fluid Dynamics, Barcelona, Spain, July 2018.
9. M. Xiao, Y. Zhang, and H. Chen. "Evaluation of M-SST Based IDDES with a Shear-Layer-Adapted Sub-Grid Length Scale in Separated Flows," 7th Symposium on Hybrid RANS-LES Methods, Berlin, Germany, September 2018.
10. M. Xiao, Y. Zhang, and H. Chen. "Application of Large-Eddy Simulation in Aerodynamics and Aeroacoustics," 4th National Conference on Unsteady Aerodynamics, Hefei, China, May 2018. (*Best Paper Award, about 10 in China*)
11. M. Xiao, Y. Zhang, and H. Chen. "Numerical Simulation of Separated Flow around an Iced Airfoil Based on WMLES," 3th National Conference on Aircraft Icing and Deicing, Chengdu, China, June 2018. *(Best Paper Award, about 10 in China)*
12. M. Xiao, Y. Zhang, and H. Chen. "Numerical Study of an Iced Airfoil Based on Delayed Detached-Eddy Simulation with Low Dissipation Scheme," 9th AIAA Atmospheric & Space Environments Conference, AIAA Paper 2017-3761, June 2017.
13. M. Xiao, Y. Zhang, and H. Chen. "Numerical Simulation of the Stall Behaviors of an Iced Airfoil Based on DDES," 17th National Conference on Computational Fluid Dynamics, Hangzhou, China, May 2017. (*Best Paper Award, about 15 in China*)

HONORS AND AWARDS

Outstanding Master Graduate Award (*3 recipients in school*)	2019
Scholarship of Dongnan Elevator Corporation	2019
Scholarship of National Aero-technology Import & Export Corporation (*Rank 1, only 6 recipients among 3000 undergraduates*)	2015
First Prize in MathorCup Mathematical Contest in Modeling (*9 in China*)	2015
First Prize in Certificate Authority Cup Mathematical Contest in Modeling	2014-2015
First-class Scholarship for Academic Excellence	2013-2015
National Scholarship (*top 1.5% in department*)	2013-2014
Fund on Scientific Research Program ($4000)	2014
Outstanding Delegate in Northwest District Model United Nation Conference (*8 in China*)	2014

ACTIVITIES

Volunteered to advise undergraduates in the International Mathematical Contest in Modeling	2018
Managed the mathematical contest in modeling module on the Saikr website (www.saikr.com)	2016

STANDARDIZED TESTS

TOEFL 111/120 (Reading 30+Listening 28+Speaking 25+Writing 28)
GRE Verbal 154/170 Quantitative 169/170 Analytical Writing 4.0/6.0