

Haiyang Hu

Assistant Professor

Department of Mechanical and Aerospace Engineering

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RESEARCH INTEREST

- Experimental Aerodynamics/Fluid Mechanics
- Advanced Flow Diagnose Technique
- Active Flow Control
- UAV/UAS/UAM Aerodynamics
- Multiphase Flow
- Thermal Fluids and Unsteady Heat Transfer
- Non-thermal Plasma Application

PROFESSIONAL APPOINTMENTS

Assistant Professor

University of Alabama in Huntsville

Aug 2023~Present

- Research Topic: Experimental Aerodynamics, Active and passive flow control, Multiphase flow, Advanced flow diagnosis techniques
- Teaching Courses: MAE 310 Fundamentals of Aerodynamics, MAE 311 Aerodynamic Lab, MAE 341 Thermodynamics I, MAE 610 Aerodynamics

Postdoc Research Associate

Iowa State University

May 2021~June 2023

- Advisor: Dr. Hui Hu
- Research Topic: Aircraft/Aero-engine icing, Anti-/De-icing technique, Wind turbine/Power transmission cable icing, UAV platform design and UAV icing, Molecule-based measurement techniques for super-/hyper-sonic flows, Plasma flow control and plasma anti-/de-icing, Plasma biomass treatment

EDUCATION

Ph.D. Aerospace Engineering

Iowa State University, Ames, USA

Jan 2018 – May 2021

Advisor: Dr. Hui Hu

Thesis topic: Experimental Investigations on Dynamic Ice Accretion and Unsteady Heat Transfer

M.S. Aerospace Engineering

Northwestern Polytechnical University, Xi'an, China

Sep 2013 – Mar 2016

Thesis topic: Characterization of Nanosecond Pulsed DBD Plasma Discharge in Quiescent Air

B.S. Aerospace Engineering

Northwestern Polytechnical University, Xi'an, China

Sep 2009 – Jun 2013

PUBLICATIONS

Published Journal Papers

1. **HY Hu**, K Mitsumoto, T Vechalapu, "Experimental Investigation on Interaction Between Multi-Fluidic-Oscillator Array and Crossflow", *Aerospace Science and Technology*. Vol. 165, 110505, 2025.
2. H Radhakrishnan, S. Gnanbe, A Duereh, S Uday, A Lusi, **HY Hu**, H. Hu, M. Wright and XL Bai, "Non-equilibrium plasma co-upcycling of waste plastics and CO₂ for carbon-negative oleochemicals", *Green Chemistry*, 26, pp9156–9175, 2024.
3. LC Tian, **HY Hu**, R. Veerakumar, and H Hu, "Ice Accretion Characteristics on Rotating Aeroengine Fan Blades", *Experimental Thermal Fluid Science*, Vol. 155 111181, 2024.
4. **HY Hu**, LC Tian, C Eluchie, H Sista and H Hu, "A Comparative Study of Using Superhydrophobic and Icephobic Surface Coatings for Aircraft Icing Mitigation", *AIAA Journal*, Vol. 62, No. 4, pp.1588-1600, 2024.
5. JC Wang, **HY Hu**, P He, and H Hu, "A Machine Learning Study to Predict Wind-Driven Water Runback Characteristics", *Physics of Fluids*, Vol. 35, 102104 (18 pages) 2023.
6. R. Veerakumar, **HY Hu**, LC Tian, NH Han, and H Hu, "An Experimental Study of Rime Ice Accretion on Bundled Conductors", *Experimental Thermal Fluid Science*, Vol.147, 110962 (12 pages), 2023.
7. **HY Hu**, LC Tian, and H. Hu. "Experimental Investigation on Ice Accretion Process Upon Impacting of Ice Particles onto a Heated Surface". *AIAA Journal*, 2023 61:7, 3019-3031.
8. **HY Hu**, F. Al-Masri, LC Tian, and H Hu, "Experimental Study of Dynamic Icing Process on a Pitot Probe Model ", *AIAA Journal of Thermophysics and Heat Transfer*, 2023 37:3, 632-643.
9. NH Han, MA Siddique, ZC Zhang, LC Tian, **HY Hu**, and H Hu, "A Flight-Testing Campaign to Examine Inflight Icing Characteristics and Its Effects on the Flight Performance of An Unmanned-Aerial-Vehicle". *Cold Regions Science and Technology*, Vol. 207, 103775 (11 pages), 2023.

10. R. Veerakumar, LC Tian, **HY Hu**, Y. Liu, H. Hu, “An Experimental Study of Dynamic Icing Process on an Aluminum-Conductor-Steel-Reinforced Power Cable with Twisted Outer Strands”. *Experimental Thermal and Fluid Science*, Vol. 142, 110823 (12 pages), 2023.
11. LC Tian, LK Li, **HY Hu**, and H. Hu, “An Experimental Study of Dynamic Ice Accretion Process over Rotating Aero-engine Fan Blades”. *AIAA Journal of Thermophysics and Heat Transfer*, 00:0, 1-12, 2022.
12. YH Peng, R. Veerakumar, ZC Zhang, **HY Hu**, Y. Liu, XH He, and H. Hu, “An experimental study on mitigating dynamic ice accretion process on bridge cables with a superhydrophobic coating”. *Experimental Thermal and Fluid Science*, Vol. 132, 110573, 2022.
13. WJ Huang, B. Nelson, R. Mullenex, D. Kokabi, **HY Hu**, C. Eluchie, H. Hu, A. Samanta, HT Ding, “Superhydrophobic surface processing for selective laser melting of metal parts”. *Procedia CIRP*, Vol. 108, Pages 418-423, 2022.
14. ZC Zhang, A Lusi, **HY Hu**, XL Bai, H. Hu, “An experimental study on the detrimental effects of deicing fluids on the performance of icephobic coatings for aircraft icing mitigation”. *Aerospace Science and Technology*, 119, 107090, 2021.
15. A Lusi, H. Radhakrishnan, **HY Hu**, H. Hu, XL Bai, “Plasma Electrolysis of Cellulose in Polar Aprotic Solvents for Production of Levoglucosenone”. *Green Chemistry*, Vol. 22, 7871–7883, 2020.
16. C. Kolbakir, **HY Hu**, Y. Liu and H. Hu. “An Experimental Study on Different Plasma Actuator Layouts for Aircraft Icing Mitigation”. *Aerospace Science and Technology*, Vol. 107, 106325(12 pages), 2020.
17. **HY Hu**, XS Meng, JS Cai, WW Zhou, Y. Liu, H. Hu. “Optimization of Dielectric Barrier Discharge Plasma Actuators for Icing Control”. *AIAA Journal of Aircraft*, Vol. 57, No. 2, pp383-387. 2020.
18. LK Li, Y. Liu, LC Tian, **HY Hu**, XJ Liu, I. Hogate, A. Kohli, H. Hu, “An experimental study on a hot-air-based anti-/de-icing system for aero-engine inlet guide vanes”. *Applied Thermal Engineering*, Volume 167, 114778 (12 pages), 2020.
19. Lusi A, **HY Hu** and XL Bai, “Producing high yield of levoglucosan by pyrolyzing nonthermal plasma-pretreated cellulose”. *Green Chemistry*, 22 (6), 2036-2048, 2020.
20. Y. Liu, ZC Zhang, **HY Hu**, H. Hu, A. Samanta, QH Wang, HT Ding, “An experimental study to characterize a surface treated with a novel laser surface texturing technique: Water repellency and reduced ice adhesion”. *Surface and Coatings Technology*, Volume 374, Pages 634-644, 2019.
21. XS Meng, **HY Hu**, C. Li, A. Abbasi, JS Cai, H. Hu, “Mechanism study of coupled aerodynamic and thermal effects using plasma actuation for anti-icing”. *Physics of Fluids*, 31, 037103, 2019.
22. Y. Liu, C. Kolbakir, **HY Hu**, XS Meng, H. Hu, “An experimental study on the thermal effects of duty-cycled plasma actuation pertinent to aircraft icing mitigation”. *International Journal of Heat and Mass Transfer*, Volume 136, Pages 864-876, 2019.

23. XS Meng, **HY Hu**, X. Yan, F. Liu, SJ Luo, "Lift improvements using duty-cycled plasma actuation at low Reynolds numbers". *Aerospace Science and Technology*, Volume 72, Pages 123-133, 2018.
24. Y. Liu, C. Kolbakir, **HY Hu**, H. Hu, "A comparison study on the thermal effects in DBD plasma actuation and electrical heating for aircraft icing mitigation". *International Journal of Heat and Mass Transfer*, Volume 124, Pages 319-330, 2018.
25. WW Zhou, Y. Liu, H. Hu, **HY Hu**, XS Meng, "Utilization of Thermal Effect Induced by Plasma Generation for Aircraft Icing Mitigation". *AIAA Journal*, Vol. 56, No. 3, pp. 1097-1104, 2018.
26. YX Long, HX Li, XS Meng, **HY Hu**, "Optimized plasma actuation on asymmetric vortex over a slender body". *Appl. Phys. Lett.* 112, 014101, 2018.
27. JS Cai, YQ Tian, XS Meng, XZ Han, D. Zhang, **HY Hu**, "An experimental study of icing control using DBD plasma actuator". *Exp Fluids* 58: 102, 2017.

Published Book chapter

1. **HY Hu**, LC Tian, C Eluchie, H Sista, and H. Hu, "On the Usage of Hydrophobic and Icephobic Coatings for Aircraft Icing Mitigation", include in Book Series, Progress in Adhesion and Adhesives, Volume 9, (2023), ISBN 978-1-83969-624-4, Kash Mital (eds.), Scrivener Publishing LLC.
2. C. Kolbakir, **HY Hu**, Y. Liu and H. Hu. 'An Experimental Investigation on the Thermodynamic Characteristics of DBD Plasma Actuators for Aircraft Icing Mitigation' include in Book "*Plasma Science and Technology*". ISBN 978-1-83969-624-4", Amir Shahzad (eds.), IntechOpen.

Conference publications

1. **HY Hu**, K Mitsumoto, TR Vechalapu, P Tiwari, "Experimental Investigation on Multi-Actuator Interaction of a Fluidic Oscillator Array Over a Flat Plate," AIAA 2025-0482. *AIAA Scitech 2025 Forum*. January 2025.
2. H Sista, J Wang, A Dhulipalla, **H Hu**, H Hu. "An Experimental Study on the Performance Degradation of an Offshore Wind Turbine Blade Model Induced by Ice Accretion", AIAA-2025-1234; *AIAA Scitech 2025 Forum*, January 2025.
3. CA Valentin, H Sista, A Kumar, A Samad, **HY Hu**, H Hu. "An Experimental Study on the Rain-Erosion Characteristics of Anti-Icing Coatings Used for UAV Inflight Icing Mitigation", AIAA-2025-2058, *AIAA Scitech 2025 Forum*, January 2025.
4. H. Sista, A. Dhulipalla, A. Kumar, **HY Hu**, H. Hu, "An Experimental Study on Detrimental Effects of Rainfall on Wind Turbine Blades", *AIAA Aviation 2024 Forum*, August 2024.
5. A. Kumar, K. Digavalli, **HY Hu**, H. Hu, "An Experimental Study on the Characteristics of Ice Crystal Icing over a Heated Airfoil", *AIAA Aviation 2024 Forum*, August 2024.
6. **HY Hu**, and H Hu, " Experimental Study on the Dynamic Droplet Impingement Force onto Surfaces with Various Wettability at High Weber Number, AIAA-2024-2377, *AIAA SciTech 2024 Forum*, January 2024.

7. A. Dhulipalla, NH Han, **HY Hu**, and H. Hu. "An Experimental Study to Characterize the Effects of Ice Accretion on the Performance of an UAV Propeller," AIAA 2023-3236. *AIAA Aviation 2023 Forum*. June 2023.
8. **HY Hu**, LC Tian, C. Eluchie, H. Sista and H. Hu. "An Experimental Study to Compare the Effectiveness of Superhydrophobic Coating and Icephobic Coating for Aircraft Icing Mitigation," AIAA 2023-4275. *AIAA Aviation 2023 Forum*. June 2023.
9. K. Digavalli, C. Eluchie, **HY Hu** and H. Hu. "Utilization of Pulsed Electrothermal Heating for Aircraft Icing Mitigation," AIAA 2023-4276. *AIAA Aviation 2023 Forum*. June 2023.
10. C. Eluchie, **HY Hu**, Z. Johnson, C. Gomes, J. Claussen and H. Hu. "An Experimental Study to Explore the Feasibility of Using Graphene for Aircraft Anti-/De-icing," AIAA 2023-4277. *AIAA Aviation 2023 Forum*. June 2023.
11. H. Sista, JC Wang, **HY Hu** and H. Hu. "An Experimental Study to Characterize the Effects of Ice Accretion on the Aerodynamic Performance of an Offshore Wind Turbine Blade Model," AIAA 2023-3524. *AIAA Aviation 2023 Forum*. June 2023.
12. JC Wang, H. Sista, **HY Hu**, P. He and H. Hu. "A Novel Deep Learning Based Approach for Particle Image Velocimetry with Global Motion Aggregation," AIAA 2023-4357. *AIAA Aviation 2023 Forum*. June 2023.
13. JC Wang, **HY Hu**, P. He and H. Hu. "A Data-Driven Approach to Study Nonlinear Dynamics of Wind-Driven Water Runback Flows Pertinent to Aircraft Icing Phenomena," AIAA 2023-4365. *AIAA Aviation 2023 Forum*. June 2023.
14. P. He, H. Koyuncuoglu, H. Hu, A. Dhulipalla, **HY Hu** and H. Hu. "High-fidelity aerodynamic and aerostructural optimization of UAV propellers using the adjoint method," AIAA 2023-0531. *AIAA Scitech 2023 Forum*. January 2023.
15. **HY Hu**, LC Tian, and H. Hu. "An Experimental Study of Ice Accretion Characteristics Due to Impacting of Ice Crystals onto Heated Surfaces Pertinent to Aero-Engine Icing Phenomena". AIAA 2022-3698, *AIAA Aviation 2022 Forum*. June 2022.
16. **HY Hu**, LC Tian, and H. Hu. "An Experimental Investigation on the Impinging Dynamics of Supercooled Large Droplets in comparison to Water Droplets at Room Temperature". AIAA 2022-4072, *AIAA Aviation 2022 Forum*. June 2022.
17. **HY Hu**, C. Eluchie, WJ Huang, HT Ding, and H. Hu. "An Experimental Study to Compare Water Droplet Impinging Dynamics and Wind-Driven Water Runback Process over Laser Treated Surfaces with Different Wettability Characteristics". AIAA 2022-4095, *AIAA Aviation 2022 Forum*. June 2022.
18. LC Tian, **HY Hu**, and H. Hu. "Quantification of the Ice Structures Accreted over the Surfaces of Rotating Aero-Engine Fan Blades". AIAA 2022-4117. *AIAA Aviation 2022 Forum*. June 2022.
19. H. Sista, **HY Hu** and Hui Hu. "Qualification of Ice Accretion Characteristics on a Wind Turbine Blade Model at High Liquid Water Content Levels Pertinent to Offshore Wind Turbine Icing Phenomena". AIAA 2022-4070. *AIAA Aviation 2022 Forum*. June 2022.

20. JC Wang, **HY Hu**, P. He and H. Hu. ‘A Machine Learning Prediction of the Wind-Driven Water Runback Characteristics Pertinent to Aircraft Icing Phenomena’. AIAA 2022-3243. *AIAA Aviation 2022 Forum*. June 2022.
21. C. Eluchie, **HY Hu**, Z. Johnson, C. Gomes, J. Claussen and H. Hu. “An Explorative Study to Use Graphene-based Materials for Aircraft Icing Mitigation”. AIAA 2022-4115. *AIAA Aviation 2022 Forum*. June 2022.
22. NH Han, **HY Hu** and Hui Hu. “An Experimental Investigation to Assess the Effectiveness of Various Anti-Icing Coatings for UAV Propeller Icing Mitigation”. AIAA 2022-3964. *AIAA Aviation 2022 Forum*. June 2022.
23. A. Dhulipalla, N. Han, **HY Hu** and H. Hu. “A Comparative Study to Characterize the Effects of Adverse Weathers on the Flight Performance of an Unmanned-Aerial-System”. AIAA 2022-3962. *AIAA Aviation 2022 Forum*. June 2022.
24. LC Tian, J. Hiller, NH Han, **HY Hu** and H. Hu. “An Experimental Study on a Hybrid Anti-/De-icing Strategy for Aero-Engine Inlet Guide Vane Icing Protection”. AIAA 2022-3456. *AIAA Aviation 2022 Forum*. June 2022.
25. **HY Hu**, F. Al-Masri, and H. Hu. “An Experimental Study on Ice Accretion and Anti-/De-Icing of a Pitot Tube”. AIAA 2022-1913. *AIAA SCITECH Forum*, Jan 2022.
26. NH Han, **HY Hu**, and H. Hu. “An Experimental Investigation on the Dynamic Ice Accretion Process over the Blade Surface of a Rotating UAV Propeller”. AIAA 2022-1538. *AIAA Scitech Forum*, Jan 2022.
27. **HY Hu**, Y. Liu, and H. Hu. “An Explorative Study to Use Super- Hydrophilic/Super-Hydrophobic Hybrid Surfaces for Aircraft Icing Mitigation”. *International Conference on Icing of Aircraft, Engines, and Structures*, Minneapolis, Minnesota, June 17-21, 2019.
28. C. Kolbakir, Y. Liu, **HY Hu**, and H. Hu. “An Experimental Study on the Effects of the Layout of DBD Plasma Actuators on Its Anti-/De-Icing Performance for Aircraft Icing Mitigation”. *International Conference on Icing of Aircraft, Engines, and Structures*, Minneapolis, Minnesota, June 17-21, 2019.
29. **HY Hu**, HX Li, XS Meng, JL Wang, F. Liu and SJ Luo. “Instantaneous and Time-averaged Flow Dynamics Induced by Nanosecond Pulsed SDBD Plasma Actuation”. *32nd International Symposium on Shock Waves*, ISSW32, 2019.
30. C. Kolbakir, **HY Hu**, Y. Liu, and H. Hu. “A Hybrid Anti-/De-Icing Strategy by Combining NS-DBD Plasma Actuator and Superhydrophobic Coating for Aircraft Icing Mitigation”. AIAA 2019-0050. *AIAA Scitech 2019 Forum*. January 2019.
31. Y. Liu, C. Kolbakir, **HY Hu**, and H. Hu. “An Explorative Study to Use Thermal Effects of Duty-Cycled Plasma Actuation for Aircraft Icing Mitigation”. AIAA 2018-3653. 2018 Atmospheric and Space Environments Conference. *AIAA Aviation*, June 2018.
32. C. Li, **HY Hu**, XS Meng, JS Cai, and H. Hu. “Aerodynamic and Thermal Effects of Plasma Actuators on Anti-icing over an Airfoil”. *2018 Asia-Pacific International Symposium on Aerospace Technology*, Lecture Notes in Electrical Engineering, vol 459. Springer, Singapore.

33. **HY Hu**, HX Li, XS Meng, X. Yan, F. Liu, and SJ Luo. "Optimization of Dielectric Barrier Discharge Plasma Actuators for Conical-Forebody Flow Control". AIAA 2016-4018, *47th AIAA Plasmadynamics and Lasers Conference, AIAA Aviation Forum*, June 2016.
34. **HY Hu**, HX Li, XS Meng, JL Wang, F. Liu, and SJ Luo. "Phase-Locked Schlieren of Periodic Nanosecond-Pulsed DBD Actuation in Quiescent Air". AIAA 2016-1696, *54th AIAA Aerospace Sciences Meeting, AIAA SciTech Forum*, Jan 2016.
35. YX Long, HX Li, XS Meng, **HY Hu**, F. Liu, and SJ Luo. "Conical Forebody Flow Control Using Thick Dielectric Barrier Plasma Actuators". AIAA 2016-0057. *54th AIAA Aerospace Sciences Meeting, AIAA SciTech Forum*, Jan 2016.
36. **HY Hu**, HX Li, XS Meng, JL Wang, F. Liu, and SJ Luo. "Starting Flow by Repetitive Nanosecond Pulsed DBD Actuation at Microseconds and Milliseconds in Quiescent Air". AIAA 2015-2956, *46th AIAA Plasmadynamics and Lasers Conference, AIAA Aviation Forum*, June 2015.
37. XS Meng, X. Yan, **HY Hu**, F. Liu and SJ Luo. "Plasma Laminar-Separation-Bubble Control over Airfoil at Low Reynolds Numbers," AIAA 2015-2954. *46th AIAA Plasmadynamics and Lasers Conference, AIAA Aviation*, June 2015.

HONORS / AWARDS

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| • AIAA Gas Turbine Engine Best Paper | 2022 |
| • Research excellent reward | 2021 |
| • Alexander Lippisch Scholarship | 2019 |
| • National Scholarship for Postgraduate/Graduate students of China | 2016 |