Dr. Hui Hu

Martin C. Jischke Professor in Aerospace Engineering
Associate Chair for Graduate Education
Director, Aircraft Icing Physics & Anti-/De-Icing Technology Laboratory
Director, Advanced Flow Diagnostics & Experimental Aerodynamics Lab

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Education

Ph.D. Mechanical Engineering, The University of Tokyo, Japan, 2001
M.S. Aerospace Engineering, Beijing University of Aeronautics and Astronautics (BUAA), China, 1993
B. S. Aerospace Engineering, Beijing University of Aeronautics and Astronautics (BUAA), China, 1990

Academic Appointments

Iowa State University (2004 - Present)
Department of Aerospace Engineering

- *Martin C. Jischke Professor*, 2015 - present
- *Associate Dept. Chair for Graduate Education*, 2015 - present
- *Full Professor*, 2013-present
- *Associate Professor*, 2009-*2013*
- *Assistant Professor*, 2004-*2009*

Awards and Honors

- Fellow, American Society of Mechanical Engineers (ASME).
- Associate Fellow, American Institute of Aeronautics and Astronautics (AIAA).
- Outstanding Faculty Mentor Award, Iowa State University, 2016.
- Renewable Energy Impact Award, Iowa Energy Center, USA, 2014.
- Air Force Summer Faculty Fellowship Award, 2008.

Teaching

UNDERGRAD: Engr160: Engineering Problems and Computer Programming; AerE243: Fundamentals of Aerodynamics; AerE344: Experimental Aerodynamics and Propulsion Laboratory,

GRADUATE: AerE541: Incompressible Aerodynamics; AerE545: Advanced Flow Diagnostic Techniques for Thermal-Fluid Studies.

Research

Interest Areas: ▪Fundamental studies on challenging thermal-fluids problems: ▪aircraft icing physics, aero-engine icing and anti-/de-icing; ▪wind turbine aeromechanics and wind farm aerodynamics.; ▪heat transfer of gas turbines and cooling technology; ▪UAS aerodynamics and bio-inspired flow dynamics; ▪fluid-structure interactions (FSI) of built structures in violent tornadic and storms winds. ▪Advanced flow diagnostics and instrumentation: ▪Particle Image Velocimetry (PIV) and Stereoscopic Particle Image Velocimetry (SPIV); ▪Pressure Sensitive Paint (PSP) and Temperature Sensitive Paint (TSP); ▪Molecular Tagging Velocimetry (MTV) and Molecular Tagging Thermometry (MTT); ▪Quantum Dots (QD) thermal imaging and Digital Image Projection (DIP) techniques.

Sponsored Grants: Received ~ $14M total in funded research with over 50 research grants from federal agencies such as NSF, NASA, DoE, AFOSR, NAVY, USDA and NOAA, and aerospace industrials such as GE, P&W, DuPont and Collins Aerospace Systems.

Selected Publications (6 book chapters; over 130 journal papers; ~ 250 conference papers; ~100 invited lectures; H-index = 34; I10-index = 110)

1. Y. Liu, ZC Zhang, HY Hu, A. Samanta, QH Wang, HT Ding and **H. Hu**. "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*, 374:634-644, 2019.
2. Y. Liu, WL Chen, YH Peng, and **H. Hu**. "An Experimental Study on the Dynamic Ice Accretion Processes on Bridge Cables with Different Surface Modifications", *Journal of Wind Engr. & Industrial Aerodynamics*, 190: 218-229, 2019.
3. LY Gao, Y. Liu, LQ Ma, and **H. Hu**. "A Hybrid Strategy Combining Minimized Leading-Edge Heating and Superhydro-/Ice-phobic Surface Coating for Wind Turbine Icing Mitigation", *Renewable Energy*, 140:943-956, 2019.
4. Y. Liu, C. Kolbakir, HY Hu, XS Meng, and **H. Hu**. "An Experimental Study on the Thermal Effects of Duty-Cycled Plasma Actuation for Aircraft Icing Mitigation", *International Journal of Heat and Mass Transfer*, 136:864-876, 2019.
5. XS Meng, HY Hu, C. Li, A. Abbasi, JS Cai, and **H. Hu**. "Mechanism study of coupled aerodynamic and thermal effects using plasma actuation for anti-icing", *Physics of Fluids*, 31:037103, 2019.
6. LY Gao, Y. Liu, and **H. Hu**, "An Experimental Investigation of Dynamic Ice Accretion Process on a Wind Turbine Airfoil Model under Various Icing Conditions", *International Journal of Heat and Mass Transfer*, 133:930-939, 2019.
7. W. Tian, A. Ozbay, and **H. Hu**. "A wind tunnel study of wind loads on a model wind turbine in atmospheric boundary layer winds", *Journal of Fluids and Structures*, 85:17-26, 2019.
8. LK Li, Y. Liu, ZC Zhang and **H. Hu**, "Effects of Thermal Conductivity of Airframe Substrate on the Dynamic Ice Accretion Process Pertinent to UAS Inflight Icing Phenomena", *International Journal of Heat and Mass Transfer*, 131:1184-1195, 2019.
9. Y. Liu, LK. Li, WL Chen, W. Tian and H**. Hu**, "An Experimental Study on the Aerodynamic Performance Degradation of a UAS Propeller Model Induced by Ice Accretion", *Experimental Thermal and Fluid Science*, 102:101-112, 2019.
10. Y. Liu, C. Kolbakir, A. Starikovskiy, R. Miles and **H. Hu**, "An Experimental Study on the Thermal Characteristics of NS-DBD Plasma Actuation and Application for Aircraft Icing Mitigation". *Plasma Sources Science and Technology*, 28, 014001(24pp), 2019.
11. WW Zhou, D. Peng, YZ Liu and **H. Hu**, "Assessment of film cooling's surface quantities using pressure and temperature-sensitive paint: comparisons between shaped and sand-dune inspired holes". *Experimental Thermal and Fluid Science*, 101:16-26, 2019.
12. LY Gao, Y Liu, WW Zhou, and **H. Hu**, "An Experimental Study on the Aerodynamic Performance Degradation of a Wind Turbine Blade Model Induced by Ice Accretion Process". *Renewable Energy*, 133: 663-675, 2019.

Thesis Advisor/Co-advisor and Postgraduate-Scholar Sponsor

Current (August 2019): N.H. Han (PhD); L.C. Tian (PhD); H.Y. Hu (PhD); R. Veerakumar (PhD); Z.C. Zhang (PhD); C. Kolbarkir (PhD); F. Al-Masri (MS).

Doctoral (16): L.Y. Gao (2019); L.Q. Ma (2019); L.K. Li (2018); Z. Ning (2018); P. Premaratne (2018); H.X. Li (2017); Y. Liu (2017); W.W. Zhou (2016); M. Khosravi (2016); K. Zhang (2015); Z. Wang (2015); A. Ozbay (2014); Y. Zhang (2013); M.L. Yu (2012); Z.F. Yang (2009); Z.Y. Jin (2008).

Masters (9): P. Sagar (2017); D. Dvorak (2012); T. Grager (2011); A.Kumar (2011); H. Iagarashi (2010); L. Clemens (2009); J. Murphy (2008); K. Varma (2007); M. Tamai (2007).

Professional and Outreach Activities

Editorship:

- Editor, *Experimental Thermal and Fluid Science*, Elsevier.
- Associate Editor, *ASME Journal of Fluids Engineering*.
- Associate Editor, *SCIENCE CHINA Physics, Mechanics & Astronomy*, Springer.
- Editorial Board, *Acta Mechanica Sinica*, Springer.
- Editorial Board, *Journal of Bionic Engineering*, Elsevier.
- Editor, *Journal of Flow Visualization and Image Processing*, Begell House Press.

Organization/Scientific Committees for International Conferences:

- *2019 International Symposium on Thermal-Fluid Dynamics (ISTFD2019),* Xi'an, China.
- *2019 Pacific Symposium on Flow Visualization and Image Processing* (PSFVIP-12), Taipei City.
- *2019 International Symposium on Particle Image Velocimetry (PIV-13)*, Munich, Germany.
- *2019 International Conference on Nature Inspired Surface Engineering* (2019NISE), New Jersey, USA.
- *2018 Asian Conferences on Experimental Mechanics (2018ACEM), Xian, China.*
- *2017* Symposium of North American Wind Energy Academy (NAWEA 2017), Ames, Iowa. USA.
- *2016 International Retreat on Vortex Dynamics & Vorticity Aerodynamics*