Harsha Sista

515-715-6851 • hsista@iastate.edu • Google Scholar

Education

- **PhD in Aerospace Engineering** — **Iowa State University**
  Ames, Iowa — *2021 – 2025*
  - **Thesis title:** Experimental Studies on the Detrimental Effects of Adverse Weather on Offshore Wind Turbines
  - **Major Professor:** Dr. Hui Hu
- **Bachelor's in Engineering in Mechanical Engineering** — **BITS Pilani**
  Hyderabad, India — *2016 – 2020*

Awards and Professional Honors

- **Graduate Teaching Excellence Award** — **Nov 2024**
  Conferred by the Graudate College at Iowa State University
  - Nominated by the Department of Aerospace Engineering to recognize outstanding teaching achievements.
- **CIRTL Associate Certificate** — **Oct 2024**
  As part of the Preparing Future Faculty (PFF) Program at Iowa State
  - Offered by the Center for Integration of Research, Teaching, and Learning (CIRTL), this selective program covers the basics of faculty life, and offers additional experience in teaching, mentoring, and learning.
- **Best Student Paper Award in Applied Aerodynamics** — **Jul 2024**
  American Institute of Aeronautics and Astronautics (AIAA) Aviation Forum
  - Won the best paper award for my research paper titled "An Experimental Study on the Detrimental Effects of Rainfall on Wind Turbines".
- **Graudate Mentor of the Year** — **May 2024**
  Ronald E. McNair Postbaccalaureate Achievement Program
  - Awarded for mentoring an undergraduate student aiming to pursue graduate research.
- **Graduate Research Excellence Award** — **Dec 2023**
  Conferred by the Graudate College at Iowa State University
  - Nominated by the Department of Aerospace Engineering to recognize outstanding research accomplishments.
- **Alexander Lippisch Scholarship** — **Apr 2023**
  Conferred by the Graudate College at Iowa State University
  - Nominated by the Department of Aerospace Engineering to recognize excellence in academics and research.

Teaching Experience

- **Graduate Teaching Assistant** — **Spring 2022-2024, Fall 2024**
  AER E 3440: Aerodynamics and Propulsion Laboratory
  - In charge of the lab for this junior-level undergraduate course, teaching 2-4 sections of 20 students each.
  - Responsibilities included developing setting up experiments, grading lab reports and pre-lab assignments, and being the point of contact between the students and the instructor.
  - Developed slides for each of the 13 labs to facilitate an easier visual understanding.
  - Guest lecturer for 4-5 lectures during the lecture portion of the course, teaching a class of 60 students.
- **Graduate Teaching Assistant** — **Fall 2022**
  AER E 5450: Experimental Flow Mechanics and Heat Transfer
  - In charge of the lab component of this graduate-level course, teaching 2 sections of 20 students each.
  - Set up all the experiments and being the point of contact between the students and the instructor.
  - Coordinated lab visits to external research laboratories relevant to the course as part of the curriculum.

- **Graduate Teaching Assistant** **Fall 2021**
  AER E 1600: Aerospace Engineering Problems and Computer Applications
  - Taught the lab portion two sections of this freshman-level undergraduate course of 40 students each.
  - Responsibilities included grading homework and assignments, helping the students debug their codes, and mentoring students during the design and build process of their own Lighter-Than-Air (LTA) vehicles.
- **Undergraduate Teaching Assistant** **Spring 2020**
  HSS F340: Post-Colonial Literature
  - Reviewed new material with the instructor to add to the content of this junior-level undergraduate course.

Research Experience

- **Doctoral Thesis** **Aug 2021 – Present**
  Supervisor: Dr. Hui Hu
  - **Thesis Title:** Experimental Studies on the Detrimental Effects of Adverse Weather on Offshore Wind Turbines.
  - Qualification and Quantification of Ice Accretion Characteristics on a Wind Turbine Blade Model at High Liquid Water Content levels using high-speed imaging, 3D scanning, and force measurement techniques.
  - Investigation of performance degradation due to heavy rainfall at high Liquid Water Content levels.
  - Characterization of the effect of saltwater on the ice accretion characteristics pertinent to offshore wind turbines and the effect of salt on the erosion of applied coatings.
- **Nextera Energy** **May 2023 – Dec 2023**
  Research Intern *West Palm Beach, Florida*
  - Worked with the Blades and Structures team to analyze icing on Wind Turbines in various sites across the country and assessing the impact of icephobic coatings as a practical anti/de-icing strategy.
- **Research Assistant** **Jan 2020 – May 2021**
  Supervisor: Dr. K.R.C. Murthy
  - Designed a novel laparoscopic surgical device that combines the functionality of a forceps, a suction-irrigation apparatus and a Carbon Dioxide insufflator. The design has been formalized as Indian Patent Number 552878.
  - Simulated the multiphase flow physics of blood, water, and Carbon Dioxide using ANSYS Fluent.
- **Bachelors Thesis** **Jul 2019 – Dec 2019**
  Supervisor: Dr. Luigi Vigevano
  - Studied the aerodynamics of the flow field around the fuselage and tail rotor of a helicopter.
  - Interpreted the results for aeroelastic purposes with the objective of noise reduction by the rotorcraft.

Mentorship

- **Graduate Student Mentor** **Jan 2024 – Present**
  Ronald E. McNair Postbaccalaureate Achievement Program
  - Mentored an undergraduate student in his research about characterizing the erosion due to lunar regolith. Student is currently doing a Co-op in Collins Aerospace and will apply for graduate school next year.
- **Graudate Student Mentor** **Aug 2021 – Present**
  Aerospace Engineering Honors Program
  - Mentored 3 undergraduate students in their freshman honors program, involving them in my research projects, and helping them with their year-end research presentations.

Publications, Patents, and Book Chapters

Patents

Title: Laparoscopic Surgical Device *IN Patent Number: 552878*

- The device combines the functionality of a forceps, a suction-irrigation apparatus and a Carbon Dioxide insufflator into a sleek, modern design.
- Patent granted in 2024 for a period of 20 years.

Conference Publications

1. **H. Sista**, A. Dhulipalla, A. Kumar, HY. Hu, H. Hu "An Experimental Study on Detrimental Effects of Rainfall on Wind Turbine Blades", *2024 AIAA Aviation Forum and ASCEND, Las Vegas, NV.*
   https://arc.aiaa.org/doi/10.2514/6.2024-4147
2. **H. Sista**, HY. Hu, H. Hu "An Experimental Study of Dynamic Ice Accretion Process on Wind Turbine Blades", *20th International Workshop on Atmospheric Icing of Structures, 2024, Narvik, Norway.*
   https://munin.uit.no/handle/10037/34100
3. **H. Sista**, C. Kolbakir, HY. Hu, X. Bai, H. Hu "A Novel, Plasma-Based Anti/De-icing System for Wind Turbine Icing Protection", *20th International Workshop on Atmospheric Icing of Structures, 2024, Narvik, Norway.*
   https://munin.uit.no/handle/10037/34100
4. **H. Sista**, A. Dhulipalla, A. Kumar, HY. Hu, H. Hu "An Experimental Study on Detrimental Effects of Rainfall on the Aerodynamic Performance of a Wind Turbine Blade Model ", *Bulletin of the American Physical Society 2023*
   https://meetings.aps.org/Meeting/DFD23/Session/T04.8
5. **H. Sista**, J. Wang, HY. Hu, H. Hu "An Experimental Study to Characterize the Effects of Ice Accretion on the Aerodynamic Performance of an Offshore Wind Turbine Blade Model", *2023 AIAA Aviation Forum and Exposition, San Diego, CA.*
   https://arc.aiaa.org/doi/10.2514/6.2024-4147
6. **H. Sista**, HY. Hu, L. Tian, H. 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", *2022 AIAA Aviation Forum and Exposition, Chicago, IL.*
   https://arc.aiaa.org/doi/10.2514/6.2022-4070
7. K. Digavalli, **H. Sista**, A. Kumar, A. Samad, H. Hu , "Unsteady Heat Transfer Characteristics of Aircraft Anti- /De-Icing with Continuous and Pulsed Surface Heating", *2024 AIAA Aviation Forum and ASCEND, Las Vegas, NV.*
   https://arc.aiaa.org/doi/abs/10.2514/6.2024-4074
8. M. Muhammed, A. Dhulipalla, **H. Sista**, K. Digavalli, M.S. Virk, H.A. Khawaja, H. Hu "Experimental study of superhydrophobic coating effects on dynamic ice accretion process along S-1223 airfoil", *20th International Workshop on Atmospheric Icing of Structures, 2024, Narvik, Norway.*
   https://munin.uit.no/handle/10037/34100
9. J. Wang, **H. Sista**, HY. Hu, P. He, H. Hu "A Novel Deep Learning Based Approach for Particle Image Velocimetry with Global Motion Aggregation", *2023 AIAA Aviation Forum and Exposition, San Diego, CA.*
   https://arc.aiaa.org/doi/abs/10.2514/6.2023-4357
10. HY. Hu, L. Tian, C. Eluchie, **H. Sista**, H. Hu "An Experimental Study to Compare the Effectiveness of Superhydrophobic Coating and Icephobic Coating for Aircraft Icing Mitigation", *2023 AIAA Aviation Forum and Exposition, San Diego, CA.*
    https://arc.aiaa.org/doi/abs/10.2514/6.2023-4275
11. K. Digavalli, **H. Sista**, C. Eluchie, HY. Hu, H. Hu , "Utilization of Pulsed Electrothermal Heating for Aircraft Icing Mitigation", *2023 AIAA Aviation Forum and Exposition, San Diego, CA.*
    https://arc.aiaa.org/doi/abs/10.2514/6.2023-4276

Journal Publications

1. HY. Hu, L. Tian, C. Eluchie, **H. Sista**, H. Hu "A Comparative Study of Using Superhydrophobic and Icephobic Surface Coatings for Aircraft Icing Mitigation", *AIAA Journal 0 0:0, 1-13, 2024. 4*
   https://arc.aiaa.org/doi/10.2514/1.J063579
2. M.A.R. Junaidi, **H. Sista**, K.R.C. Murthy, Y.V.D. Rao, A. Gokhale "Simulation of non-Newtonian flow of blood in a modified laparoscopic forceps used in minimally invasive surgery", *Computer methods in biomechanics and biomedical engineering, 24(16), 1794–1806*
   https://doi.org/10.1080/10255842.2021.1919884

3. M.A.R. Junaidi, **H. Sista**, K.R.C. Murthy, Y. Rao, A. Gokhale "Challenges in the Design of a Laparoscopic Surgical Forceps", *In: Rao, Y.V.D., Amarnath, C., Regalla, S.P., Javed, A., Singh, K.K. (eds) Advances in Industrial Machines and Mechanisms. Lecture Notes in Mechanical Engineering. Springer.* **https://link.springer.com/chapter/10.1007/978-981-16-1769-0$_4$0**
4. M.A.R. Junaidi, **H. Sista**, K.R.C. Murthy, Y. Rao, A. Gokhale "Simulation of insufflation gas via an alternative Multi-functional Forceps with applications in Laparoscopic Surgeries", *International Journal of Biomedical Engineering and Technology* **https://doi.org/10.1504/ijbet.2021.10048204**
5. Johnson, Zachary; Ellis, Griffin; Pola, Cicero; Banwart, Christopher; McCormick, Abby; Leite Miliao, Gustavo; Duong, Duy; Opare-Addo, Jemima; **Sista, Harsha**, Smith, Emily; Hu, Hui; Gomes, Carmen; Claussen, Jonathan "Enhanced Laser-Induced Graphene Microfluidic Integrated Sensors (LIGMIS) for On-site Biomedical and Environmental Monitoring" *ACS Nano* (Under Review)

Book Chapters

1. H. Hu, **H. Sista** "On the usage of Hydrophobic and Icephobic Coatings for Aircraft Icing Mitigation", *Progress in Adhesion and Adhesives* (Accepted)

Leadership and Service

- **Reviewer** **Oct 2024 – Present**
  Experimental Thermal and Fluid Science
  - Invited to be a reviewer for an article in Experimental Thermal and Fluid Science journal, an Elsevier Journal, with the possibility of reviewing more articles in the future.
- **Graduate Student Panel** **Jun 2024**
  McNair Program from the University of Wisconsin Platteville
  - Hosted undergraduate students part of the McNair program at UW Platteville as part of their campus visit to explore graduate studies at Iowa State.
  - Participated in a graduate student panel to provide perspective about graduate student life and experiences at Iowa State University.
- **Graudate Student Panel** **Oct 2023**
  American Institute of Aeronautics and Astronautics Student Chapter at Iowa State Unviersity
  - Participated in a graduate student panel to provide perspective about graduate student life and experiences.
  - Presented my research and spoke about the opportunities offered at the Department of Aerospace Engineering.
- **Renders and CAD Lead for Team Hyperloop India** **Jan 2019 - May 2020**
  Participated in the SpaceX Hyperloop Pod Competition
  - Was the Renders and CAD Lead in 2019, supervising the creation of the CAD models for the various subsystems of the full-scale prototype and creating renderings for the same.
  - Simulated propulsion system components and designed the pneumatic braking base station for the pod in 2018, which aimed to achieve speeds in excess of 450 kmph and handle deceleration of upto 3.5 g.
- **Team Lead for the CANSAT Design-Build-Fly Competition** **Jan 2018 - May 2019**
  Organized by the American Astronautical Society
  - Led the university team consisting of 10 students participating in an international student competition in 2019, coordinating between various subsystems to develop a prototype of a working satellite.

Memberships

- American Institute of Aeronautics and Astronautics **2022-Present**
- American Physical Society **2023-Present**

Skills

- **Experimental:** ISU Icing Research Tunnel Testing — High-Speed Imaging — 3D Scanning — 3D Printing — Particle Image Velocimetry — Ice Adhesion and Contact Angle measurements — Infra-Red Imaging — Alternating Current (AC) and Nanosecond Plasma
- **Mechanical:** Solidworks — ANSYS - Workbench, Fluent, ICEM — Tecplot — Geomagic Wrap — ABAQUS — Fusion 360 — CREO — AutoCAD — Keyshot — COMSOL
- **Programming:** MATLAB — Python — Java — C++ — MS Office — LaTeX — Linux

References

- **Dr. Hui Hu**
  Major Professor
  Anson Marston Distinguished Professor in Engineering
  Martin C. Jishke Professor in Aerospace Engineering
  Director of Graduate Education, Department of Aerospace Engineering
  Howe Hall - Room 2249, Iowa State University
  537 Bissell Road, Ames, Iowa 50011-1096, USA.
  Email: huhui@iastate.edu

- **Dr. Shahram Pouya**
  Instructor-in-charge of teaching Aerodynamics and Propulsion Laboratory
  Associate Teaching Professor in Aerospace Engineering
  Howe Hall - Room 2324, Iowa State University
  537 Bissell Road, Ames, Iowa 50011-1096, USA.
  Email: pouya@iastate.edu

- **Dr. Partha Sarkar**
  Mentor, ISU Preparing Future Faculty Program
  Professor in Aerospace Engineering
  Director, Wind Simulation and Testing (WiST) Laboratory
  Professor, Civil, Construction and Environmental Engineering (Courtesy)
  Howe Hall - Room 2343, Iowa State University
  537 Bissell Road, Ames, Iowa 50011-1096, USA.
  Email: ppsarkar@iastate.edu