AIAA 76th ANNUAL SOUTHEASTERN REGIONAL STUDENT CONFERENCE

AIAA

THURSDAY EVENTS

Welcome to the Region II Student Conference, where the brightest minds in the field gather to explore the future of flight and space exploration! We're thrilled to have you here to share your innovative ideas, connect with peers, and engage with cutting-edge advancements in aerospace technology. Get ready for an exciting journey of discovery, collaboration, and inspiration as we push the boundaries of what's possible in the skies and beyond!

8:00 AM Keynote
Location: Grand Ballroom

Adam Amar
Orion Aerothermodynamics System Manager
NASA Johnson Space Center

Adam will share his expertise honed through years of academic and professional experience in computational fluid dynamics and ablative thermal protection systems.

12:30 PM - 2:00 PM Luncheon
Location: Grand Ballroom
Sponsored by Reed Integration

David Robinson
CEO
Corvid Technologies and
Corvid Cyberdefense

From NASA-Langley research and Naval Surface Warfare contributions to founding Corvid Technologies and Corvid Cyberdefense. Expect insights into innovation and leadership in defense technology.

Sponsor Tables
Location: Outside Grand Ballroom

Several sponsors will be onsite Thursday throughout the day. They will be available to discuss opportunities and programs with student attendees. This is a great opportunity to grow your professional network. Please stop by as your schedule allows.

6:00 PM Evening Social
Sponsored by Onyx Aerospace

Greensboro Science Center Aquarium
4301 Lawndale Dr, Greensboro, NC 27455

NCSU is pleased to host a reception for conference attendees to be held at the Greensboro Science Center's Aquarium from 6 PM to 9 PM on Thursday, April 3rd. The Aquarium consists of two large rooms with a variety of enclosures for aquatic and semi-aquatic animals - it is a great spot for networking and just enjoying each other's company! A taco bar and drinks will be provided at no charge to the attendees. Attendees will need to arrange transportation from the conference venue to the GSC.

THURSDAY - HIGH POINT

Undergraduate/Team

8:45 AM "Vibration-Driven Self-Assembly in 4D Printing: From Spheres to Airfoils"; Cooper Mendlinger; University of Georgia

9:15 AM "Empirical Evaluation of Hexacopter Performance Post-Single Rotor Failure"; Leonard Yan; North Carolina State University

9:45 AM "Design and Implementation of a Data Acquisition System for Rocket Motor Testing and Performance Analysis"; Saptak Das; Joey Clary; Georgia Institute of Technology

10:15 AM - 10:30 AM Break

10:30 AM "Studying the Effects of a Backward Facing Step in Enhancing Fuel Mixing in Scramjets"; Grayson Hayes; Embry-Riddle Aeronautical University

11:00 AM "Design and Fabrication of an EDS-Enabled Brush Prototype for Lunar Dust Mitigation"; Nishant Sood; Georgia Institute of Technology

11:30 AM "Pressure Distribution Analysis for Aerodynamic Characterization Across Varying Flight Regimes"; Mason Roddy; Christian Pack; University of Tennessee

12:00 PM "An Aerodynamic Study of Multirotor Uncrewed Aircraft System Using Motion Capture Technology"; Rachael Lander; Megan Wolfe; Mississippi State University

12:30 PM - 2:00 PM Lunch

2:00 PM "Development of a Head-End Ignition System for the Sustainer Motor of a Two-Stage Sounding Rocket"; Avantika Goel; Nandini Kotamurthy; Georgia Institute of Technology

2:30 PM "Development of a Butterfly Inspired Micro Aerial Vehicle with Figure-8 Wing Motion"; Caroline Waugh; Jorge Mares Zamora; University of Alabama in Huntsville

3:00 PM "Increasing the Range & Effectiveness of Air-to-Air Missiles using Directed Energy Weapons (Lasers) Integrated with Missiles"; Allen Pradhan; Embry-Riddle Aeronautical University

3:30 PM "Requirements for A Vacuum Chamber to Replicate the Space Environment"; Natalie Perez; Gabriella Araujo; University of Florida

4:00 PM - 4:15 PM Break

4:15 PM "The Use of Regolith Simulant as a Material for Building Functional Sensors in Extreme Environments"; Sofia de Hoffmann; Lexi Greenwood; Embry-Riddle Aeronautical University

4:45 PM "Proposal for a CubeSat probe constellation to map Titan's atmosphere"; Giol Vinyals-i-Roca; Embry-Riddle Aeronautical University

5:15 PM "Erosion and Deposition Comparison of Biochar, Pumice, and Arizona Test Dust on Titanium Coupons"; a team project by Virginia Tech

THURSDAY - GREENSBORO

Undergraduate

8:45 AM "Impacts of Metasurface Antenna Technology in the Aerospace Industry"; Daria Astaire; Peyton Hay; Florida Institute of Technology

9:15 AM "A Practical Approach to Plate-Solving of Astronomical Images Based on Least-Squares Estimation"; Cindy Uyen Chi Nguyen; Embry-Riddle Aeronautical University

9:45 AM "Controlling Motion of Levitating Drops in A Wind Tunnel Using Velocity Wells"; Aaron Matheny; University of Tennessee

10:15 AM - 10:30 AM Break

10:30 AM "Experimental Characterization of a Quadrotor's Response to an Air Vortex Cannon"; Kyle VanHorn; University of North Carolina at Charlotte

11:00 AM "Conceptual Design of a Mars-Oriented Blended Wing Body Aircraft with Distributed Propulsion"; Sohini Gupta; Wheeler High School

11:30 AM "Development of a Student-Built LOX/Kerosene Coaxial Swirl Injector"; Dario Zaccagnino; Georgia Institute of Technology

12:00 PM "Advancing CFD Approaches for Jet-Stirred Reactors"; Omar Hamwy; University of Georgia

12:30 PM - 2:00 PM Lunch

2:00 PM "Performance of Ammonia Fuel for a Commercial Grade Turbofan"; Ethan Nall; Auburn University

2:30 PM "Overcoming Lunar and Martian Dust Challenges"; Yash Chaudhari; Embry-Riddle Aeronautical University

3:00 PM "Print Quality Optimization of an Open-Source High-Temperature FDM 3D Printer for Thermoplastic Materials"; Evan Garrison; Luke Salisbury; Mississippi State University

3:30 PM "Schlieren Imaging of a X-51 Model in a Hypersonic Arcjet Tunnel"; Carson Waddell; University of Tennessee

4:00 PM - 4:15 PM Break

4:15 PM "Design and Assembly of a Mars Rover Four-Wheel Rocker System"; Isabelle Pinto; Zachary Gan; Georgia Institute of Technology

4:45 PM "Design of a General-Purpose Optimal Controller via the hp-Radau Collocation Method"; Nicholas Hirsch; University of Florida

5:15 PM "Numerical Investigation of Transonic Flow Characteristics Around a Compound Delta Wing"; Andrew Marion; Kennesaw State University

THURSDAY - CARDINAL

Teams

8:45 AM "Experimental Analysis of a Student-Built Kerosene and Liquid Oxygen Rocket Engine Test Stand"; a team project by Georgia Institute of Technology
9:15 AM "Advancing EVA Suit Design: A Comparative Study of Mechanical Counter-Pressure Forearm Sleeves"; a team project by Mississippi State University
9:45 AM "Additive Manufacturing and Its Potential for Aircrafts and the AIAA DBF Competition"; a team project by University of Memphis

10:15 AM - 10:30 AM Break

10:30 AM "Investigating Photovoltaic Efficiency and Durability in Low Earth Orbit Through Nanosatellite Payload Design"; a team project by Rhodes College
11:00 AM "Novel Coaxial and Differential Thrust Vector Control Systems for Small-Scale Rockets"; a team project by Georgia Institute of Technology
11:30 AM "STARGATE: An Undergraduate Experimental Gridded Ion Thruster Student Research Project"; a team project by University of Alabama in Huntsville
12:00 PM "Innovative Lander-Deployed Penetrator for Mars Subsurface Exploration Using Cold Gas Propulsion"; a team project by Embry-Riddle Aeronautical University

12:30 PM - 2:00 PM Lunch

2:00 PM "Design and Validation of the Fluids System for a Regulated Pressure-Fed Liquid Rocket Engine Test Stand"; a team project by University of Alabama in Huntsville
2:30 PM "Scarlet Gimbal Rocket Design and Launch Report"; a team project by Georgia Institute of Technology

3:00 PM "Design of a High Altitude Balloon Satellite"; a team project by University of South Carolina

3:30 PM "Development of an LQR Controller for a Jet Vanes Rocket"; a team project by Georgia Institute of Technology

4:00 PM - 4:15 PM Break

4:15 PM "Variable-_ength, Drag-Reducing Aerospike"; a team project by Mississippi State University

4:45 PM "Structural Development, Analysis, and Testing of a Full Scale Jet Vane Thrust Vector Control Rocket for Active Stabilization"; a team project by Georgia Institute of Technology
5:15 PM "Analysis of an Inflatable, Multi-Shelled Membrane Structure for Lunar Additive Manufacturing"; a team project by University of Tennessee

THURSDAY - PIEDMONT

Teams

8:45 AM "Compact Wind Turbine Blade Design and Testing"; a team project by University of North Carolina at Charlotte

9:15 AM "Spline-Based Flight Path Planning and Following for Aerial Navigation"; a team project by Georgia Institute of Technology

9:45 AM "Progress Towards Hotfire of a Student-Built Liquid Bipropellant Rocket Engine"; a team project by University of Alabama in Huntsville

10:15 AM - 10:30 AM Break

10:30 AM "Mechanical Design and Structural Analysis of a Jet Vane Assembly for Thrust Vectoring in Solid Rocket Motors"; a team project by Georgia Institute of Technology
11:00 AM "Feasibility Study of a Motion Capture Based, Moveable Three-Dimensional Digital Image Correlation System"; a team project by Mississippi State University
11:30 AM "Development of a Remotely Operated Reentry Rover for Planetary Exploration"; a team project by University of South Carolina

12:00 PM "Experimentally Characterizing Shear Strength of Structural Adhesives Through Surface Preparations"; a team project by Georgia Institute of Technology

12:30 PM - 2:00 PM Lunch

2:00 PM "Implementation and Uses of Telemetry Communications in a Sounding Rocket"; a team project by University of Georgia

2:30 PM "Compression Molding Fabrication of C/C Composite Produced via Highly Processable BODA-Derived Precursor Resin System"; a team project by Mississippi State University
3:00 PM "Development of a High-Performance Avionics System for Real-Time Guidance and Control in High-Power Vehicles"; a team project by Georgia Institute of Technology
3:30 PM "CLEOSATRA: Computation in Low Earth Orbit Satellite for Reliable Accessibility"; a team project by North Carolina State University

4:00 PM - 4:15 PM Break

4:15 PM "Design and Development of Bat-Inspired Unmanned Aerial System for Mapping and Navigation"; a team project by Kennesaw State University
4:45 PM "Development of a Control System for a Liquid Rocket Engine Test Stand"; a team project by University of Alabama in Huntsville

5:15 PM "Comparative Study of Nonlinear Attitude Estimation in GNC Testbeds for Collegiate Self-Landing Rockets"; a team project by Georgia Institute of Technology

THURSDAY - EMERALD

Freshman/Sophomore Open Topic

8:45 AM "Methods of Space Debris Removal in LEO"; Alexander Berthelot; University of Tennessee

9:15 AM "A Review or Quantum Computing Implications for Space Exploration and Mars Colonization."; Philip Andriola; University of Florida

9:45 AM "High School Payload Challenge: Inspiring High School Students to Experience the Professional Design Process"; Caterina Fratta; Ian Soledade; Georgia Institute of Technology

10:15 AM - 10:30 AM Break

10:30 AM "The Orbiter: Pushing the Boundaries of Conventional Rocketry"; Yash Malik; Florida Institute of Technology

11:00 AM "Mars Spectroscopy and Tracking for Atmospheric Research"; Ibrahim Arnous; Joseph Colangelo; Embry-Riddle Aeronautical University

11:30 AM "Fuel Optimization in Commercial Supersonic Aircraft"; Marina Jenkins; Ryan Murdoch; University of Florida

12:00 PM "Brighter Future"; Samantha Jones; University of Tennessee

12:30 PM - 2:00 PM Lunch

2:00 PM "Exploring the Safety Concerns of the V-22 Osprey"; Isabel Mancini; Emily Marshall; Florida Institute of Technology

2:30 PM "The Future of Aviation: Integrating IoT in the Aerospace Industry"; Nicole Kutcher; University of Tennessee

3:00 PM "Review of Mishaps in Rendezvous and Proximity Operations"; Isabella Fernandez; University of Florida

3:30 PM "Advancing Laser Communication for Mars Orbital Missions"; Om Acharya; Embry-Riddle Aeronautical University

4:00 PM - 4:15 PM Break

4:15 PM "Review of Hypersonic Vehicle Engine Optimization"; Peter Waszkowski; Nicholas Pisani; Florida Institute of Technology

4:45 PM "Mitigating Orbital Debris"; Caelan Wommack; Georgia Institute of Technology

FRIDAY - HIGH POINT

Undergraduate

8:00 AM "Analysis of a Generic T-Tail Transport using a Surface-Vorticity Panel Method Flow Solver at Low Angles of Attack"; Cade May; Auburn University

8:30 AM "Computationally Generated Charts for Critical Local Buckling Stress of L-, T-, and Cruciform-Section Columns"; Joshua Griffin; Mississippi State University

9:00 AM "Additive Manufacturing of Phase-Change Material Suspended in Photocurable Resin for Thermal Energy Storage"; Caleb Collins; University of Tennessee

9:30 AM "Design and Analysis of High-Bypass Turbofan Engine Nacelle to Enhance Performance"; Mouhamadou Diop; Kennesaw State University

10:00 AM - 10:15 AM Break

10:15 AM "Design and Analysis of Medium Form Factor Stealth UAVs with Variable Sweep Wings for ISR Missions Utilizing Advanced Composite Materials for Radar Absorption"; Dheer Chhabria; Embry-Riddle Aeronautical University

10:45 AM "Off-road Terrain Mapping for Autonomous Ground Vehicle Energy-Optimal Path Planning"; Matt Nguyen; University of North Carolina at Charlotte

11:15 AM "Exploring Applications for Solar Electric Aircraft"; Kai Komatsu; Georgia Institute of Technology

Scan this QR code to access the full online version of the conference materials!

https://region2.aiaastudentconference.org/collection/2025

FRIDAY - GREENSBORO

Undergraduate/Outstanding Branch Activity

8:00 AM "Development of an Outdoor Aerial Multi-Agent Robot Environment at the UF Autonomy Park"; James Cross; University of Florida
8:30 AM "Detonation and High-Speed Imaging of PETN Energetic Materials"; Atharva Gujrathi; Andy Zheng; Georgia Institute of Technology
9:00 AM "Simulation of Fluid Sloshing in High-Acceleration Environments for Aerospace Applications"; Hesha Amin; Connor Perrine; University of Georgia
9:30 AM "Planetary Locomotion Systems for Enhanced Mobility Through Hybrid and Adaptive Methods"; Haitish Gandhi; Embry-Riddle Aeronautical University

10:00 AM - 10:15 AM Break

10:15 AM "Inspiring Future Engineers: AIAA UTK's Commitment to STEM Education and Outreach"; Christian Pack; Mason Roddy; Cole Perry; University of Tennessee *
10:30 AM "Redefining Possibilities: The Student-Led Movement That Forever Changed Aerospace at Auburn"; Austin Miranda; Auburn University *
10:45 AM "GT-AIAA Expanding Case Study Initiatives"; Ethan Traub; Rishita Mhatre; Georgia Institute of Technology *

11:00 AM "Florida Tech-AIAA: Going Bigger"; Jaxon Strank; Florida Institute of Technology *

11:15 AM "Implementing Collaboration and Structure: Bolstering USC AIAA in the Aerospace Community"; Michael Cargill; Patrick Bailey; University of South Carolina *

FRIDAY - CARDINAL

Teams

8:00 AM "Development of Fixed-wing drone design with glider deploying capability"; a team project by University of Alabama in Huntsville

8:30 AM "Field Falcon: A Multirotor Drone for Assessing Farm Conditions After Severe Weather"; a team project by North Carolina State University
9:00 AM "The Design of a Modular Avionics System for a Liquid Spaceshot Rocket"; a team project by Georgia Institute of Technology

9:30 AM "DART: A Small-Scale Demonstrator for Rapid and Precise Rocket Payload Delivery"; a team project by Florida Institute of Technology

10:00 AM - 10:15 AM Break

10:15 AM "Optimization of Disc Baffle Perforation in Sloshing Nitrous Oxide Tanks"; a team project by Georgia Institute of Technology

10:45 AM "Battery Autonomous Transfer Module for Aerial Networks (BATMAN)"; a team project by Mississippi State University

11:15 AM "Design and Testing of an Airbrake System for a Sounding Rocket"; a team project by University of Georgia

11:45 AM "A CFD Investigation of Dragonfly Gliding Flight: Aerodynamic Analysis of Corrugated Wings Using Arbitrary Mesh Interface (AMI) and Dynamic Meshing in OpenFOAM"; a team project by Georgia Institute of Technology

* Outstanding Branch Activity

FRIDAY - PIEDMONT

Teams

8:00 AM "Applied machine-learning-based metal additive manufacturing for lightweight aerospace components"; a team project by Mississippi State University
8:30 AM "Integrated State Estimation Development for Actively Controlled Rockets"; a team project by Georgia Institute of Technology

9:00 AM "Large-Eddy Simulations of the King's Plain Wind Farm"; a team project by University of Memphis

9:30 AM "Effective Ground Systems for Amateur and Research-Oriented Rocketry"; a team project by Georgia Institute of Technology

10:00 AM - 10:15 AM Break

10:15 AM "OUROBOROS, An Undergraduate Design and Analysis of a Hall Thruster for Small-Sat Applications"; a team project by University of Alabama in Huntsville
10:45 AM "Operating Systems for Real-Time Avionics"; a team project by Georgia Institute of Technology

11:15 AM "Utilization of a Portable Ground Station to Conduct Site Surveys in the S-Band Frequency for CubeSat at MSU's Mission"; a team project by Mississippi State University
11:45 AM "LQR Control for a Mono-Propelled VTOL Drone"; a team project by University of Florida

FRIDAY - SALON A & B

Teams

8:00 AM "Aerodynamic Modeling for Thrust Vector Control Rocketry"; a team project by Georgia Institute of Technology

8:30 AM "Overview of Bell X-1 Inspired RC Aircraft: USC's Submission for Design Build Fly"; a team project by University of South Carolina

9:00 AM "Fusion-Based Utilization and Synthesis of Efficient Detections"; a team project by Mississippi State University

9:30 AM "Design and Analysis of a Vertical Thrust Stand for Liquid Rocket Engines"; a team project by University of Alabama in Huntsville

10:00 AM - 10:15 AM Break

10:15 AM "Design and Analysis of Axial Turbine Power Extraction from a Small-Scale Rotating Detonation Rocket Combustor"; a team project by North Carolina State University
10:45 AM "Mars Exploration and Surveillance Assets"; a team project by Embry-Riddle Aeronautical University

11:15 AM "Computational Modeling of Jet Vanes for Thrust Vector Control"; a team project by Georgia Institute of Technology

11:45 AM "Design and Construction of Glider for AIAA DBF Competition"; a team project by University of Alabama in Huntsville

FRIDAY - EMERALD

Graduate

8:00 AM "Space Exploration Challenges, A Novel Investigation and Study of Unmanned Space Vehicles"; Rahul Kumar Arram; Aashman Gupta; Embry-Riddle Aeronautical University
8:30 AM "Evolution of the Bidirectional Vortex in a Capped Ellipsoidal Cyclonic Rocket Engine"; Patrick Eid; Auburn University

9:00 AM "Star Elimination as a Means of Resident Space Object Identification for Space Situational Awareness"; Evan Pavetto-Stewart; Embry-Riddle Aeronautical University
9:30 AM "Supersonic Aircraft Design Using Generative AI"; Jacob Pence; Parker Blenk; University of Georgia

10:00 AM - 10:15 AM Break

10:15 AM "Harnessing Aerospace Fluid Mechanics and Cavitation for Biomedical Engineering: Advancing Non-Invasive Therapies, Drug Delivery, and Medical Devices"; Jubel Kurian; Virginia Tech
10:45 AM "Aerodynamic Analysis of a High-Powered, Multi-Stage Rocket"; Parker Blenk; Jason Rupram; University of Georgia

11:15 AM "Design and Fabrication of Lithium-ion Battery Case with Integrated Internal Cooling Channels Using Binder Jetting Additive Manufacturing"; Henil Patel; Embry-Riddle Aeronautical University
11:45 AM "Optimal Stable Configurations for a High Efficiency Quadrupole Vortex Hybrid Rocket Engine"; Mitchell Sisk; Auburn University

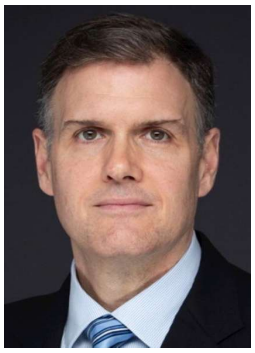
FRIDAY EVENTS

2:00 PM HondaJet Tour

Selected attendees will be able to tour Honda Aircraft Company's production facility located at the Greensboro Airport. Honda builds the world's most advanced light jet - the HondaJet family at the facility. The Greensboro facility also houses a team of aircraft designers and engineers who work to make the next generation of HondaJet aircraft, such as the new HondaJet Echelon, a reality. Attendees were preselected or this tour. No changes or additions are possible.

2:30 PM How to Stand Out
Location: Piedmont

Knowing how to make yourself stand out relative to other candidates will be invaluable for your career. Whether you are applying for scholarships & fellowships, seeking admission to graduate schools, or searching for internships and employment opportunities, standing out brings your unique and applicable skills and talents to the forefront and conveys to decision-makers that you are an excellent bet. In this session, professionals from industry, government, and academia that have previously had to employ these skills will provide thoughts on how a student can make their resume stand out and strategies for applying to opportunities. The session will start with presentations emphasizing key points, followed by small group interactions with professional attendees at the conference.



5:30 PM Social
Location: Outside Grand Ballroom

6:30 PM Awards Banquet
Location: Grand Ballroom

Patrick Porter
Vice President of
Flight Test and Flight Operations
Honda Aircraft Company

Join us for the Awards Banquet! This special evening will celebrate excellence as we announce the winners across all award categories, recognizing outstanding achievements in our field. Don't miss this opportunity to enjoy a delicious meal, engaging company, and the thrill of honoring our community's best!

Prize winners and professional attendees are invited to attend the Winners' Reception immediately following the awards banquet sponsored by Amentum.

CONTRIBUTORS

Thanks are offered to those companies, groups, universities and individuals whose financial assistance, equipment, and/or services made this conference possible.

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ACKNOWLEDGEMENTS

The AIAA Region II Sections are now in their 70th year of participation in sponsoring the Region II Student Conference. Special thanks to all of the volunteers on the Region II Student Conference Committee, the faculty advisors, the on-site judges, and the technical paper judges.

Thanks to the AIAA Foundation for their generous financial support of all of the AIAA Regional Student Conferences. The AIAA Foundation provides award funding for the undergraduate, graduate, and team categories.

The host for the 2025 Region II Student Conference is the Student Branch from North Carolina State University.

AIAA Student Branch Chair
Preston Duffy

AIAA Student Branch Faculty Advisor
Dr. Jack Edwards, Professor
Mechanical and Aerospace Engineering Dept.

76th ANNUAL SOUTHEASTERN REGIONAL STUDENT CONFERENCE
APRIL 3-4, 2025

Greensboro-High Point Marriott Airport
Greensboro, North Carolina

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North Carolina State University

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