

Applied Aerodynamics Aviation Forum 2027

Technical discipline chairs

Gustavo Halila, Embraer

Vishal Bhagwandin, US DEVCOM Army Research Lab

Robert Deters, Embry-Riddle Aeronautical University

Topic description

Papers are solicited in the areas of theoretical, experimental, and computational approaches to aerodynamics applications. Relevant areas of interest include, but are not limited to, flight or ground vehicle aerodynamic design, analysis of wing/rotor/vehicle aerodynamic performance, methods for modeling aerodynamic bodies, and novel studies or technological applications related to aerodynamic applications. Specific areas of interest are listed below:

- Aerodynamic Design: Application
- Aerodynamic Design: Methods and Techniques (joint APA/MDO)
- Aerodynamic Flow Control: Analytical, Computational, and Experimental
- Aerodynamic Testing: Ground, Wind-Tunnel, and Flight Testing (joint APA/GT/FT)
- Aerodynamics of Inlets and Nozzles (joint APA/HSABP/INPSI)
- Aero-Propulsive Interactions and Aerodynamics of Integrated Propeller Systems
- AI/ML-based, Reduced-Order, and Data-Driven Aerodynamic Modeling
- Airfoil/Wing/Configuration Aerodynamics (joint APA/ACD)
- Applied Aeroelasticity and Fluid-Structure Interaction
- Applied CFD: External Aerodynamics
- CFD Methods for Aerodynamic Applications (joint APA/FD)
- Exascale Computing Applications (joint FD/APA/CFD2030)
- Flow Control: Methods and Applications (joint FD/APA)
- High- and Low-Speed Flows: Optical Diagnostics and Experimental Techniques (joint APA/PDL)
- Integrated (Digital and Physical) Collaborative Experimentation (joint GT/APA)
- Low Speed, Low-Reynolds Number and Bio-Inspired Aerodynamics (joint FD/APA)
- Meshing, Geometry Modeling, and Visualization for CFD Applications (joint MVCE/APA/FD/CFD2030)
- Missile/Projectile/Munition Aerodynamics, Carriage & Store Separation
- Multidisciplinary Sensitivity Analysis and Optimization (joint MDO/APA/FD)
- Other Topics in Applied Aerodynamics
- Propeller/Rotorcraft/Wind Turbine Aerodynamics
- Quantum Computing for Fluid Dynamics (joint FD/APA/CFD2030)
- Small/medium uncrewed, bio-inspired, and solar-powered aircraft system ConOps and design (APA/TF)
- Sonic Boom – Physics, Testing, Modeling and Applications (joint AA/APA/FD)
- Supersonic/Hypersonic Aerodynamics and Flow Physics (joint APA/FD)
- Transition Control and Application (joint FD/APA)

- Transonic Buffet-Flow Physics, Testing and Modeling (joint FD/APA)
- Uncertainty Quantification, Grid Quality, and Error Estimation (joint FD/MVCE/APA)
- Unmanned Aerial Vehicles/Systems, and Micro Air Vehicles
- Unsteady Aerodynamics and Massively Separated Flows (joint APA/FD)
- Verification, Validation, and Uncertainty in CFD and Testing (joint FD/TP/APA)

Special sessions

Session Title: A Tribute to Philip Roe: Advances in Numerical Methods for CFD in Aerospace Applications. Joint Session: MVCE/APA/FD/CFD2030

Description: This invited session honors the legacies of Philip Roe, one of the most influential figures in the history of CFD, whose ideas continue to shape numerical methods and design approaches used in aerospace. In his honor, this session brings together researchers from around the world working on both fundamental and applied aspects of Computational Fluid Dynamics (CFD) to provide an open forum for discussing the future directions of CFD. This session highlights recent advances in algorithmic development for active flux, high-order and adaptive numerical methods, and hypersonics.

Is this an invited session? YES

POC: Devina Sanjaya (devina.p.sanjaya@gmail.com)

Session Title: Advancing the Frontiers of CFD: Celebrating the Legacy of Antony Jameson and Towards CFD 2030. Joint Session: APA/MVCE/FD/CFD2030

Description: This invited session celebrates the enduring contributions of Antony Jameson, whose pioneering work has profoundly influenced modern Computational Fluid Dynamics (CFD). Building on the foundations, the session brings together leading invited researchers from academia, industry, and government laboratories to discuss his contribution and impact, emerging challenges and opportunities shaping the next generation of CFD. Topics include high-order discretization methods, adjoint-based design optimization, and advances in solver and scalable algorithms for exascale computing. The session aims to provide a vibrant forum for reflecting on the field's evolution while charting future directions for CFD research and applications.

Is this an invited session? YES

POC: Siva Nadarajah (siva.nadarajah@mcgill.ca)

Session Title: Aeromechanics in Degraded Environments

Description: This special session aims to provide a collaborative platform for researchers to understand and address knowledge gaps pertaining to the aeromechanics of aerial vehicles in degraded environments. Topics of discussion will center around re-defining degraded environments for AAM, physics-informed, repeatable, scalable, and transferable frameworks to study AAM aeromechanics in degraded environments, instrumentation for large-scale environment characterization, on-demand environment simulation, and numerical models for AAM aeromechanics in degraded environments.

Is this an invited session? YES

POC: Shreyas Narsipur (snarsipur@ae.msstate.edu); Daniel Foti (dvfoti@memphis.edu)

Session Title: Multiprop-Wing Aero-Propulsive Interaction Modeling Correlated to CRM Experiments

Description: This session is dedicated to aerodynamic modeling of any fidelity level. Participants/authors will develop computational models based on the provided geometry, entire experimental setup and testing conditions for a Common Research Model (CRM) that features several leading-edge mounted propellers on a wing with high-lift devices (flaps at multiple angles). The provided test conditions such as advance ratio, RPM and thrust setting will be appropriate for low-order aero modeling such as used for design, and

the geometry will provide information sufficient for high-fidelity wing- and blade-resolved simulations. Correlations will be made to experimental data obtained from wind tunnel tests, giving the community an opportunity to benchmark their simulations. Papers as well as oral-only presentations are welcome.

Is this an invited session? NO

POC: Juergen Rauleder (juergen.rauleder@gatech.edu); Shreyas Narsipur (snarsipur@ae.msstate.edu)

Session Title: State of the Art in Aerodynamic Shape Optimization. Joint Session: APA/MDO

Description: This invited session brings together researchers and practitioners advancing the state of the art in aerodynamic shape optimization, spanning theoretical formulations, numerical algorithms, and industrial applications. The session provides an open forum to discuss recent progress in gradient-based and gradient-free optimization methods, adjoint formulations, and the integration of machine learning techniques into aerodynamic shape optimization workflows. Contributions addressing both fundamental methodological advances and applied case studies across subsonic, transonic, and supersonic regimes are welcome.

Is this an invited session? YES

POC: Gustavo Halila (halila.gustavo@gmail.com); Rhea P. Liem (r.liem@imperial.ac.uk)

Session Title: Weapon Bay Store Separation Workshop (WBS²W): Advances in Store Separation Aerodynamics

Description: This invited session showcases papers submitted as part of the Weapon Bay Store Separation Workshop (WBS²W), bringing together researchers and practitioners working on the aerodynamics of internal carriage and store separation from weapon bays. The session provides a forum to discuss advances in cavity flow physics, store trajectory prediction, computational and experimental methods for store separation analysis, and validation approaches for internal carriage configurations.

Is this an invited session? YES

POC: Hadar Ben-Gida (bengida@technion.ac.il); David Bacci (david.bacci@eng.ox.ac.uk)

Student paper competition

Please direct questions to: Reza Djeddi, Cadence Design Systems (reza.djeddi@outlook.com)

Award Name

Applied Aerodynamics Student Paper Competition

The Applied Aerodynamics Technical Committee is sponsoring the APA Student Paper Competition. Eligible written papers will be judged by members of the APATC Education Subcommittee for the “Best Paper” award. The winner of the “Best Paper” award will be notified before the conference and will receive a certificate (presented during the AVIATION Plenary session) and a \$1000 award.

Additionally, there will be a “Best Presentation” award with a cash prize of \$500 awarded to the student with the best presentation. This will be based on the final work presented at the APATC Student Paper Competition technical session during the AVIATION conference.

Eligibility Requirements & Other Rules

Authorship: To be eligible, the student needs to be full-time at either the graduate or undergraduate level. Students are encouraged to submit extended abstracts that are as close as possible to the anticipated final paper. Student papers should report on work primarily conducted by students in collaboration with their faculty advisors; therefore, all primary/presenting authors of papers submitted for consideration in the Student Paper Competition must be students at the time of abstract submission.

The first author of the paper must remain the same between the abstract, final paper, and presentation. Up to two non-student co-authors are allowed.

Presentation: At conference, the presentation must be given by the primary author of the paper otherwise the paper will be disqualified from the competition.

Extended Abstract: Student abstracts must be extended abstracts that follow the rules outlined in this Call for Papers. When submitting to the abstract submission website, select “Student Paper Competition” as the paper type.

Selection Criteria

Final papers will be judged based upon the importance of the work, originality, quality, and completeness. Detailed criteria for selecting the “Best Paper” are outlined below:

- Originality of the work
- Relevance to the field of Applied Aerodynamics
- Technical quality and completeness of the work
- Clarity and style consistent with AIAA paper guidelines

For the “Best Paper” award, submissions will only be judged based on the written work and not the oral presentation. On the other hand, for the “Best Presentation” award, judges will select the paper solely based on the oral presentation at the conference.

Please note that the Best Paper and Best Presentation awards are judged independently. A single entry may be selected for both awards if it demonstrates excellence in both the written paper and the oral presentation.