AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS
DAYTON-CINCINNATI SECTION

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Vertical Flight Society

SYMPOSIUM GUIDE

The Forty-Eighth Annual

Dayton-Cincinnati Aerospace Sciences Symposium

Photo Courtesy of Ms. Susan Gorton

28 February 2023

Sinclair Ponitz Conference Center

https://www.aiaa-daycin.org/DCASS

Greater Ohio Chapter

Dayton Section

Ohio Valley Section

Human Factors and Ergonomics Society

Southern Ohio Chapter

Society for the Advancement of Material and Process

MIDWEST CHAPTER

Welcome

to the

48th AIAA Dayton-Cincinnati Aerospace Sciences Symposium (DCASS)

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The AIAA Dayton-Cincinnati Aerospace Sciences Symposium has provided a unique venue for technical communications of our regional aerospace community for 48 years. The symposium showcases cutting-edge scientific and engineering research and innovations within a one-day event through technical presentations across multiple aspects of aerospace science and technology.

More than sixty technical presentations are delivered in a day-long symposium program. Our invited keynote speaker for 2023 is Ms. Susan Gorton. Ms. Gorton has been with NASA for 24 years and has been the NASA Revolutionary Vertical Lift Technology Project lead for the past 16 years. Prior to joining NASA, she started her career as a researcher in the Army's Aeroflightdynamics Directorate, now known as the Technology Development Directorate, for 15 years. Ms. Gorton is playing a lead role in development of technologies, validating tools, and concepts to improve vertical lift vehicles that are conducted at NASA Ames, Armstrong, Glenn and Langley. Ms. Gorton will be presenting a keynote address discussing the NASA aeronautics vision for transforming aviation.

To better serve the local community to promote Science, Technology, Engineering, and Mathematics (STEM) and prepare young engineering leaders for future aerospace, this year a High School Students Invited Talk Section is created. This session will allow involvement of talented high school students around Dayton-Cincinnati area and present their science and engineering research work related to aerospace science and technology.

With the reduced impact of COVID-19, the organizing committee decided to continue the fully in-person symposium, which offers more convenient information exchange and connection opportunities. Mask usage is optional during the conference. Attendees are requested to respect the decisions of other participants and continue to take any precautions as necessary.

The symposium has been organized by a group of dedicated volunteers who team throughout the year to make this meeting a success. This meeting would not be possible without their dedicated effort. We thank the local leaders and communities supporting DCASS as general co-chairs and executive committee members, and our co-sponsoring professional societies listed within this program. This meeting is also made possible by our corporate and educational sponsors shown on the back of this program. We thank them for their generous support.

Finally, we encourage all attendees to submit their vote for the art-in-science contest. The best presentations and art-in-science award winners will be recognized at the annual Dayton-Cincinnati Section Awards Program.

We hope you enjoy today's symposium, and we look forward to seeing you again next year!

Zifeng Yang and Anil Patnaik

2023 DCASS Executive Co-Chairs

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS

DAYTON-CINCINNATI SECTION

2023 DAYTON-CINCINNATI SECTION AWARDS

CALL FOR NOMINATIONS

Recognize the achievements of your colleagues. The local Awards Banquet is going to be held on May 15th at the University of Dayton. Nominations are sought for several local awards. These include:

Outstanding Technical Contribution - Science Award: Presented to a Dayton-Cincinnati AIAA Section member(s) [limit of 2 people] to recognize a significant scientific achievement during the past year.

Outstanding Technical Contribution - Application Award: Presented to a Dayton-Cincinnati AIAA Section member(s) [limit of 2 people] to recognize a significant development or application achievement during the past year.

Outstanding Management Contribution Award: Presented to a Dayton-Cincinnati AIAA Section member(s) [limit of 2 people] for outstanding management contributions made during the past year.

There is no specific format required. Simply complete the attached form and E-mail the information. Award selections will be made by an expert panel of judges. Submit nominations (by E-mail) by **21 April 2023** to:

Dr. Marc Polanka
Tel: (937) 255-3636 x4714 E-mail: marc.polanka@afit.edu

NOMINATION FORM

(Nomination Package Must be Limited to 2 Pages)

CATEGORY:

Nominee:	**Nominator:**
Affiliation:	**Affiliation:**
Address:	**Address:**
Tel:	**Tel:**
E-mail:	**E-mail:**

Symposium Schedule At-A-Glance

Registration: 7:00 AM – 2:00 PM

Corporate Exhibits: 9:00 AM – 4:00 PM

Art in Science Competition: 9:00 AM–4:00 PM **VOTE ONLINE:** www.aiaa-daycin.org/DCASS/AIS.php

Please fill out the Survey: www.aiaa-daycin.org/DCASS/feedback.php

First Block 8:20 AM – 10:00 AM

1	Acoustics	Room 131
2	Airbreathing Propulsion	Room 171
3	Detonation	Room 116
4	Composite Materials	Room 127
5	Aircraft Aerodyanmics I	Room 133
6	Flight Dynamics & Controls I	Room 120
7	Orbital Mechanics	Room 150
8	Re-Entry Thermal Protection	Room 119

Second Block 10:20 AM – 11:20 AM

	Room Not Used	Room 131
9	Propellors	Room 171
10	Fluid Dynamics I	Room 116
11	Additive Manufacturing	Room 127
12	Digital Engineering	Room 133
13	Aerospace Engineering	Room 164
14	Space Systems I	Room 120
	Room Not Used	Room 150

Keynote Program in Frederick C. Smith Auditorium (Room 150) 11:40 AM – 12:40 PM

Lunch in Great Hall 12:40 PM – 1:40 PM

Third Block 1:40 PM – 3:00 PM

15	Computational Fluid Dynamics	Room 131
16	Combustors	Room 171
17	Fluid Dynamics II	Room 116
18	Materials & Structures I	Room 127
19	Data Analysis and Model Validation	Room 133
20	Uncertainty and Complex Data	Room 164
21	Flight Dynamics & Controls II	Room 120
22	Space Systems II	Room 150
23	Heat Transfer I	Room 119

Fourth Block 3:20 PM – 4:40 PM

24	Applied Computational Fluid Dynamics	Room 131
25	Unmanned Aerial Systems	Room 171
26	Fluid Dynamics III	Room 116
27	Materials & Structures II	Room 127
28	High School	Room 133
29	Aircraft Aerodynamics II	Room 164
30	Flight Dynamics & Controls III	Room 120
31	Space Systems III	Room 150
32	Heat Transfer II	Room 119

The abstracts for the talks presented today may be found on the following website:
https://www.aiaa-daycin.org/DCASS/list_abs.php .
The Executive Committee encourages the use of this website.

Awards Information: The Dayton-Cincinnati Section of the AIAA is proud to continue its long-standing tradition of recognizing the best work presented at this symposium, as judged by the Session Chairs. This year, awards will be made in the following technical categories:

Category	Sessions	Category	Sessions
Aerospace Enabling Technologies	12, 13, 19, 20	Heat Transfer	8, 23, 32
Aircraft & Aerodynamics	5, 9, 25, 29	Materials Science	4, 11, 18, 27
Computational Fluid Dynamics	15, 24	Propulsion	2, 3, 16
Flight Dynamics & Controls	6, 21, 30	Space	7, 14, 22, 31
Fluid Dynamics	1, 10, 17, 26	High School Students Invited Talk	28

Session Chairs will provide scores based on the quality of the abstract, innovation and magnitude of effort, technical contribution, and presentation style. One winner will be selected for each technical category, and the presenters will be invited to the AIAA Annual Awards Banquet (free ticket!) to receive their awards!

For online access to the Program-at-a-glance, please visit: https://www.aiaa-daycin.org/DCASS/glance.php

AIAA Dayton-Cincinnati Section

48th Dayton-Cincinnati Aerospace Sciences Symposium

	Room 131	Room 171	Room 116	Room 127	Room 133	Room 120	Room 150	Room 119
	SESSION 1 **Acoustics** Chair: Mark Reeder *AFIT*	SESSION 2 **Airbreathing Propulsion** Chair: Rolf Sondergaard *AFRL*	SESSION 3 **Detonation** Chair: Erik Braun *NRC*	SESSION 4 **Composite Materials** Chair: Anthony Palazotto *AFIT*	SESSION 5 **Aircraft Aerodynamics I** Chair: Paul Hsu *SOCHE*	SESSION 6 **Fluid Dynamics & Controls I** Chair: Donald Rizzetta *AFRL*	SESSION 7 **Orbital Mechanics** Chair: Hang Yi *WSU*	SESSION 8 **Re-Entry Thermal Protection** Chair: Rama Gorla *AFIT*
Time								
8:20 AM	*48DCASS-046* Variations in Screech Closure Mechanisms *Aatresh Karnam - UC* *Ephraim Gutmark - UC* *Saleem Mohammad - UC*	*48DCASS-134* Improved Operability of Hypersonic Inlets with Fluidic Injection *Ryan O'rorke - UC* *Daniel Cuppoletti - UC*	*48DCASS-017* Second-Generation Development of a Radial Rotating Detonation Engine *John Ursino - AFIT* *Marc D. Polanka - AFIT* *Kavi Muraleetharan - AFRL*	*48DCASS-012* Investigation of Edge Notch Root Radius and Lamina Orientation Effects *Henry Pyzdrowski - AFIT* *John Brewer - AFIT*	*48DCASS-114* Aerodynamic Interactions between Three Identical Wings in Close Proximity *Nevin Jestus - UD* *Sidaard Gunasekaran - UD*	*48DCASS-040* Direct Orthogonal Collocation Methods for Hypersonic Trajectory Optimization by the Process of Continuation *Noor Khan - AFIT* *Michael Zollars and* *Robert MacDermott - AFIT*	*48DCASS-041* An Approach to Multi-Phase RPOD via Model Predictive Contro *Jeremy Kaczmarek - AFIT* *Costantinos Zagaris - AFIT*	*48DCASS-069* Ablation Process in the Presence of Thin Layers *H Berk Gur - UKY* *Riu Fu, Alexandre Martin - UKY*
8:40 AM	*48DCASS-049* Acoustic Properties of Single and Twin Rectangular Jets with Integrated Internal Fluidic Injection Strategies *Kaurab Gautam - UC* *Ephraim Gutmark - UC*	*48DCASS-039* Inlet Design and Comparison Study for High-Speed Systems *Annie Price - AFRL* *Tyler Gardner - AFRL* *Logan P. Riley - AFRL* *Jose A. Camberos - AFIT*	*48DCASS-081* The Effect of Reactive Core Injection Area on Rotation Detonation Combustor Performance *Anthony Centofanti - UC* *Jorge Betancourt - UC* *Tyler Pritschau - UC* *Alec Gaetano - UC* *Ephraim Gutmark - UC*	*48DCASS-034* Optimization of Hybrid Composite Joints *Christopher Bellanova - AFIT* *John S. Brewer Jr. - AFIT* *Michael G. Gran - AFRL*	*48DCASS-102* UAS Icing Physics and Innovative Strategies for UAS Icing Mitigation *Hui Hu - ISU* *Haiyang Hu - ISU* *Anvesh Dhulipalla - ISU* *Nianhong Han - ISU* *Yang Liu - ISU*	*48DCASS-052* Determining Follower Aircraft's Optimal Trajectory in Relation to a Dynamic Formation Ring *Carl Gotwald - AFIT* *Michael Zollars - AFIT* *Isaac E. Weintraub - AFRL*	*48DCASS-092* Periodic Orbit Generation in the Sun-Venus CR3BP and Potential Missions *Robert Bettinger - AFIT* *Adam P. Wilmer - AFIT*	*48DCASS-062* Numerical Investigation of the Effects of Structural Property Variability on the Material Response of a Fibrous Ablator *Sean Mcdaniel - UKY* *Rui Fu - UKY* *Matthew Beck - UKY* *Alexandre Martin - UKY*
9:00 AM	*48DCASS-058* Characterizing Jet Interaction effects in Mach 3.9 Wind Tunnel *Titus Lee - AFIT* *Mark Reeder - AFIT* *Nathan Stieren - AFIT*	*48DCASS-064* Overall Effectiveness Superposition Theory for a Film Cooled Leading Edge *Bailey Hopkins - AFIT* *James L. Rutledge - AFIT* *Matthew N. Fuqua - AFRL*	*48DCASS-106* The Effect of Detonation Cell Size on Detonation Reinitiation and Amplification Mechanisms *Benjamin Millard - UC* *Daniel Cuppoletti - UC* *Timothy Ombrello - AFRL*	*48DCASS-068* Mechanical Properties and Performance of a Novel Nano-Engineered Unitized Composite with Quasi-isotropic Layup *Brian Pudlo - AFIT* *Marina B. Ruggles-Wrenn - AFIT*	*48DCASS-138* Extended High Lift Characteristics of Distributed Lift Configurations *Michael Mongin - AFRL* *Aaron Altman - AFRL* *Sidaard Gunasekaran - UD* *Nevin Jestus - UD*	*48DCASS-121* Development of Human Aware Navigation Framework for Autonomous Mobile Robot Operation in Airport Environment *Shurendher Kumar Sampathkumar - UC* *Daegyun Choi - UC* *Donghoon Kim - UC*	*48DCASS-047* Inverse estimation of the Kentucky Re-entry Universal Payload System (KRUPS) flight trajectory *Bruno Tacchi - UKY* *Alexandre Martin - UKY* *Savio J. Poovathingal - UKY*	*48DCASS-070* Decomposition and permeability of room temperature vulcanizing (RTV) silicone *Luis Chacon - UKY* *Ben Deaton, Savio J. Poovathingal - UKY*
9:20 AM	*48DCASS-091* Frequency-Wavenumber Spectrum of Acoustic Radiation from High-Speed Turbulent Boundary Layers *Dhiman Roy - OSU* *Lian Duan - OSU* *Meelan M. Choudhari - NLRC*	*48DCASS-105* Experimental Validation of High Lift Low Pressure Turbine Blades in Transonic Cascade *Ryan Sauder - WSU* *Mitch Wolff - WSU* *Andrew Lethander - AFRL* *John Clark - AFRL*	*48DCASS-043* Analysis of Pressure Coupling between the Fuel/Oxidizer Plenums and the Combustor of a Hollow Rotating Detonation Combustor With Reacting Core *Bret Lane - UC* *Tyler Pritschau - UC* *Ephraim Gutmark - UC*	*48DCASS-063* Oxidation observation and realistic three-dimensional modeling of carbon-carbon composites *Cameron Brewer - UKY* *Savio J. Poovathingal - UKY*	*48DCASS-103* A Machine Learning Prediction and Discovery of the Wind-Driven Water Runback Characteristics Pertinent to Aircraft Icing Phenomena *Jincheng Wang - ISU* *Haiyang Hu - ISU* *Ping He - ISU* *Hui Hu - ISU*	*48DCASS-130* Autonomous Path Planning of UAVs in Unknown Environment using Deep Reinforcement Learning *Srikanth Elkoori Ghantala Karnam - UC* *Rajnikant Sharma - UC*	*48DCASS-071* Trajectory Modeling and Property Analysis of Re-entry Vehicles *Kate Rhoads - UKY* *Alexandre Martin - UKY* *Victoria DuPlessis - UKY*	*48DCASS-109* Flow-based Characterization of TPS Permeability at Wide Ranges of Thermal Decomposition *John O'nan - UKY* *Yejajul Hakim, Michael Renfro - UKY*
9:40 AM	*48DCASS-120* Exploration of Acoustic and PIV Analysis Techniques for Electric Rotor Applications *Peter Sorensen - UC* *Daniel R. Cuppoletti - UC*	*48DCASS-125* Analysis of Swirl Distortion Production in a Swirl Generator *Marcus Acton - WSU* *Mitch Wolff - WSU* *Michael List - AFRL*	*48DCASS-133* KTP Optical Parametric Oscillator for Extended Duration High Repetition Rate Planar Laser Induced Fluorescence in a Rotating Detonation Engine *Austin Webb - PU* *Christopher Q. Crabtree - SE* *Mikhail N. Slipchenko - PU* *Terrence R. Meyer - PU* *Sean P. Kearney - SNL*	*48DCASS-098* Simulation-Aided Design of Compression Specimens with Internal Voids for Accessing New States of Stress During Ductile Fracture *Ethan White - UD* *Jeremy Seidt - OSU* *Robert Lowe - UD*		*48DCASS-131* Co-operative Navigation using Magnetic anomaly and inter-vehicle range measurements *Anuraga Sankepally - UC* *Rajnikant Sharma - UC*	*48DCASS-084* Trajectory Modeling of KREPE Mission *Victoria Duplessis - UKY* *Alexandre Martin - UKY* *Kate Rhoads - UKY*	*48DCASS-059* Development of a custom supervised learning network to model ablation of thermal protection systems materials. *Vijay Mohan Ramu - UKY* *Qiang (Shawn) Cheng - UKY* *Savio J. Poovathingal - UKY*
10:00 AM	Break							

Abbreviations:

AFIT = Air Force Institute of Technology
AFRL = Air Force Research Laboratory
BBHS = Bellbrook High School
BHS = Beavercreek High School
CSM = Colorado School of Mines
DST = Dependable System Technologies, LLC
DYN = Dynetics Inc.
FLLC = Folderol, LLC
ISU = Iowa State Univerdity
MIT = Massachusetts Institute of Technology
MOS = Mason Ohio Schools
MU = Miami University
MVC = Maverick Corporation
MVH = Miami Valley Hospital
NLRC = NASA Langley Research Center
NRC = National Research Center
OKU = Oakland Unviersity
OSU = The Ohio State University
PAR = Parallax Advanced Research
PSU = Penn State Unviersity
PU = Purdue University
RVJ = RVJ Institute
SE = Spectral Energies LLC
SNL = Sandia National Laboratory
TMVS = The Miami Valley School
TUM = The Universoty of Maine
UAH = University of Alabama in Huntsville
UC = University of Cincinnati
UCC = Utopia Compression Corp.
UD = University of Dayton
UDRI = University of Dayton Research Institute
UKY = University of Kentucky
UMD = University of Maryland
WSU = Wright State University

AIAA Dayton-Cincinnati Section

48th Dayton-Cincinnati Aerospace Sciences Symposium

	Room 131	Room 171	Room 116	Room 127	Room 133	Room 164	Room 120	Room 150
		SESSION 9 **Propellers** Chair: Kaurab Gautam *UC*	SESSION 10 **Fluid Dynamics I** Chair: Markus Rumpfkeil *UD*	SESSION 11 **Additive Manufacturing** Chair: Matilde D'arpino *OSU*	SESSION 12 **Digital Engineering** Chair: David Curtis *AFIT*	SESSION 13 **Aerospace Education** Chair: Yuvi Nanda *UD*	SESSION 14 **Space Systems I** Chair: Hui Hu *ISU*	
Time								
10:20 AM		*48DCASS-002* Vertically Offset Overlapping Propellers in Tandem *Jielong Cai - UD* *Sidaard Gunasekaran - UD* *Michael OL - FLLC*	*48DCASS-035* A Fluid-Structure Interaction Framework for the Simulation of High-Atmosphere Ice Particles in Hypersonic Environments *Ethan Huff - UKY* *Savio J. Poovathingal - UKY* *Hailong Chen - UKY*	*48DCASS-008* Testing and Characterization of Additive Manufactured Molybdenum in the AFIT Burner Rig Facility *Matthew R. Gazella - AFIT* *Marc D. Polanka - AFIT* *Ryan A. Kemnitz - AFIT*	*48DCASS-016* C-130 Off-Body Flow Field Engineering Experiment *James Ben Lewis - AFRL* *Rick Graves - AFRL*	*48DCASS-031* Systems-Based Framework for STEM Education Delivery in Diverse Technical Facilities *Adedeji Badiru - AFIT* *Melinda Tourangeau - RVJ*	*48DCASS-053* Interpretable AI-based control for tumbling satellite capture *Sathya Karthikeyan - UC* *Anirudh Chhabra, Daegyun Choi, Donghoon Kim - UC*	
10:40 AM		*48DCASS-004* Sinusoidal Gust Response of RC Propellers in Tandem Configuration *Jielong Cai - UD* *Sidaard Gunasekaran - UD*	*48DCASS-054* On the Influence of Bow Region Vortices on SFS2 Bistable Airwake *Syed Qasim Zaheer - UC* *Peter J. Disimile - UC*	*48DCASS-011* Material characterization development for additively manufactured Ti-6-4 via tension, compression, and three point bend experimentation. *James Gunderson - AFIT* *John Brewer - AFIT*	*48DCASS-100* A Primer on Category Theory for Engineers, Part I *Rachel Kinard - AFRL* *Jose A. Camberos - AFIT* *Stephen B. Johnson - DST* *Michael D. Watson - DYN* *David Perner & Bryan Mesmer - UAH*		*48DCASS-065* Experimental Validation of an Orbital Motion-generating Testbed *Anirudh Chhabra - UC* *Donghoon Kim - UC*	
11:00 AM		*48DCASS-101* Propeller-Wing Interaction and Response to a Sinusoidal Gust *Luke Duncan - UD* *Sidaard Gunasekaran - UD* *Jielong Cai - UD* \	*48DCASS-140* A Comparison of Unsteady Aerodynamic Models to Experiments in Vortical Gust Encounters and Closed Loop Mitigation *Andrew Killian - UD* *Sidaard Gunasekaran - UD* *Michael Mongin - AFRL* *Albert Medina - AFRL*	*48DCASS-096* Behavior of 3D AM Cellular Structures Under Impact *Anthony Palazotto - AFIT* *Jesse Leiffer and Ahsan Mian - WSU*	*48DCASS-082* A Primer on Category Theory for Engineers Part 2 *Jose A. Camberos - AFIT* *Rachel M. Kinard - AFRL* *Stephen B. Johnson - DST* *Michael D. Watson - DYN* *David Perner and Bryan Mesmer - UAH*		*48DCASS-132* Real-Time Inertia Estimation of Satellite Motion Aping Robotic Testbed (SMART) *Daegyun Choi - UC* *Sameer Bhalla - UC* *Shurendher Kumar Sampathkumar - UC* *Donghoon Kim - UC*	
11:20 AM	Break							
11:40 AM	KEYNOTE PROGRAM (see next page for details)							
12:40 PM	Lunch Break							

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UDRI = University of Dayton Research Institute
UKY = University of Kentucky
UMD = University of Maryland
WSU = Wright State University

48th AIAA Dayton-Cincinnati Aerospace Sciences Symposium

Please join us at 11:40 for the Keynote Program:

Welcome and Announcements:

DR. ZIFENG YANG

2023 DCASS Executive Chair

Keynote Address:

NASA Aeronautics Vision for Transforming Aviation

MS. SUSAN GORTON

NASA Revolutionary Vertical Lift Technology Project Lead

The NASA Aeronautics vision includes enabling new options for air travel using vehicles propelled by electricity, flying passengers faster than the speed of sound, and by managing air traffic at every altitude with the help of new automated systems that are even safer and more efficient than today.

Ms. Susan Althoff Gorton will provide an overview of the NASA Aeronautics Mission Directorate current focus on transforming aviation to make it more sustainable and more accessible than ever before, with emphasis on the challenges and research in the emerging market of Advanced Air Mobility.

Ms. Gorton has been with NASA for 24 years and has been the NASA Revolutionary Vertical Lift Technology Project lead for the past 16 years. The project mission is to develop and validate tools, technologies, and concepts to improve vertical lift vehicles. Ms. Gorton is responsible for the work in this area that is conducted at NASA Ames, Armstrong, Glenn and Langley. Prior to joining NASA, she was a researcher in the Army's Aeroflightdynamics Directorate, now known as the Technology Development Directorate, for 15 years.

Ms. Gorton has a Bachelor of Science in Aerospace Engineering from the University of Illinois and a Master of Science in Aeronautics from the George Washington University. Ms. Gorton has authored or co-authored over 85 publications, and she is the recipient of numerous awards, including the NASA Outstanding Leadership Medal (three times), the NASA Exceptional Achievement Medal, the Army Civilian Service Medal, the Army Research and Development Award, the University of Illinois Aerospace Engineering Outstanding Alumna award, and the Vertical Flight Society's AgustaWestland International Fellowship Award. She was recently part of the team that won the Collier Trophy for the Ingenuity Mars Helicopter.

Ms. Gorton is an Honorary Fellow of the Vertical Flight Society and Associate Fellow of the AIAA. She also holds a helicopter private pilot's license.

AIAA Dayton-Cincinnati Section

48th Dayton-Cincinnati Aerospace Sciences Symposium

	Room 131	Room 171	Room 116	Room 127	Room 133	Room 164	Room 120	Room 150	Room 119
	SESSION 15 **Computational Fluid Dynamics** Chair: David Hurlburt *PT*	SESSION 16 **Combustors** Chair: Rydge Mulford *UD*	SESSION 17 **Fluid Dynamics II** Chair: Darrell Crowe *AFIT*	SESSION 18 **Materials & Structures I** Chair: John Brewer *AFIT*	SESSION 19 **Data Analysis and Model Validation** Chair: Chandu Bryan *UD*	SESSION 20 **Uncertainty and Complex Data** Chair: Marina Ruggles-wrenn *AFIT*	SESSION 21 **Flight Dynamics & Controls II** Chair: Jielong Cai *UD*	SESSION 22 **Space Systems II** Chair: Carl Hartsfield *AFIT*	SESSION 23 **Heat Transfer I** Chair: James Rutledge *AFIT*
Time									
1:40 PM	*48DCASS-024* Validation of Code Leo on Transonic Axial Compressor Open Test Case *James Wnek - WSU*	*48DCASS-050* The Effect of Fuel Injection Location on Supersonic Combustor Operation *Erik Braun - NRC* *Stephen D. Hammack - AFRL* *Timothy M. Ombrello - AFRL*	*48DCASS-021* Boundary Layer Stability Predictions for HIFLIER 1 *Tim Leger - PAR* *Matthew Tufts - AFRL* *Nicholas Bisek - AFRL*	*48DCASS-023* Topics in Solid Mechanics *Anthony Palazotto - AFIT*	*48DCASS-015* Machine Learning for Monocular-Vision based Spacecraft Pose Estimation *Quang Tran - AFIT* *Clark Taylor - AFIT* *Scott Nykl - AFIT* *David Curtis - AFIT* *Jeffrey Choate - AFIT*	*48DCASS-137* Sensor Fusion based Automated Shoulder Drop-off Assessment Using UAV *Sandeep Bandarupalli - UC* *Eshaan Khanapuri - UCC* *Rajnikant Sharma - UC*	*48DCASS-033* Estimation of Optimal Flight Control for a Helicopter in a Total Power Loss Scenario Using the Proximal Policy Optimization Algorithm *Eidahn Eliash - AFIT* *Donald Kunz - AFIT*	*48DCASS-026* Fault Diagnosis Algorithm for DC Lunar Microgrid Applications *Matilde D'arpino - OSU* *Gabriel Heyer - OSU*	*48DCASS-010* Microscale Flow and Heat Transfer in Thermal Management Applications *Rama Gorla - AFIT*
2:00 PM	*48DCASS-073* Python based API to post-process CFD data *Harpreet Singh Chhabra - UC* *Dilip Kalagotla - UC* *Paul Orkwis - UC*	*48DCASS-051* Combustion Dynamics in a Swirl-stabilized Cavity Combustor *Kranthi Yellugari - UC* *Rodrigo Villalva Gomez - UC* *Ephraim Gutmark - UC*	*48DCASS-030* Low-frequency Unsteadiness in Shock Wave-Turbulent Boundary Layer Interaction Generated by a Forward Facing Curved Wall *Logan Szajnecki - OSU* *Gary L. Nicholson - OSU* *Lian Duan - OSU* *Nicholas J. Bisek - AFRL*	*48DCASS-083* Computational Analysis of Residual Stress of Additively Manufactured Lattice Structures *Katie Bruggeman - WSU* *Anthony Palazotto - WSU* *Nathan Klingbeil - WSU* *Joy Gockel - CSM*	*48DCASS-020* Evaluation of SysML for Developing Model Validation Hierarchies for Model-Based Systems Architectures *Harry Byers - AFRL* *Rick Graves - AFRL*	*48DCASS-116* Uncertainty Modeling for Precise Navigation in Advanced Air Mobility Framework using Range-only Measurements in Urban Environments with Unreliable GPS *Rohith Boyinine - UC* *Eshaan Khanapuri - UCC*	*48DCASS-036* Optimal Control of Precision Airdrop Trajectories Using Direct and Indirect Collocation Methods *Edward Maxwell - AFIT* *Michael D. Zollars - AFIT*	*48DCASS-029* Multi-Agent, Optimal NMC Transfer Trajectories for Application to Spacecraft Inspection Missions *Mark Mercier - AFIT* *David Curtis - AFIT*	*48DCASS-090* Modal Thermal Conduction in Strained Fibrous Insulation *Christopher Barrow - UKY* *John F. Maddox - UKY*
2:20 PM	*48DCASS-080* Optimization of RANS Based Turbulence Models Using Neural Networks *Jacob Welsh - UC* *Paul Orkwis - UC*	*48DCASS-074* Limit Cycle Oscillation Dynamics in a MLDI Combustor *Yuvi Nanda - UC* *Rodrigo Villalva Gomez - UC* *Ephraim Gutmark - UC*	*48DCASS-072* Investigation of flow structures generated by local adverse pressure gradients in high aspect ratio rectilinear nozzles. *Roshan Baskaran - UC* *Daniel R Cuppoletti - UC*	*48DCASS-111* Mechanical Behavior of Additively Manufactured Metal Lattice Structures *Jeremy Seidt - OSU* *Ben DiMarco - OSU* *Ed Herderick - OSU*	*48DCASS-038* Investigating structural system properties: a comparison between geometric and sensitivity methods, and New Directions of Research *Hesham Abdelfattah - UC* *Sameh Eisa - UC* *Peter Stechlinski - TUM*	*48DCASS-032* Rapid Neural Network Ensembles and Their Application in Estimating Epistemic Modeling Uncertainty for Adaptive Learning *Atticus Beachy - WSU* *Harok Bae - WSU* *José A. Camberos - AFRL* *Ramana V. Grandhi - AFIT*	*48DCASS-093* Attitude Control of Control Moment Gyroscopes-equipped Quadcopter in Disturbed Conditions *Sameer Bhalla - UC* *Donghoon Kim - UC*	*48DCASS-055* Simulating Astronaut-Space Robot Teams in Virtual Reality Using Affordable Hardware and Open-Source Software *Conrad Kent - UC* *Catharine McGhan - UC*	*48DCASS-113* Thermal Management Response to Abrupt Changes in Applied Heat Load *Zachary Carner - WSU* *Mitch Wolff - WSU* *Abdeel Roman - AFRL*
2:40 PM	*48DCASS-127* Implementation and Verification of an Exergy Functional In FUN3D *Neal Novotny - UD* *Markus Rumpfkeil - UD* *Jose Camberos - AFIT*	*48DCASS-122* Investigating the Effect of Flow Velocity on Jetting Motion Produced by Repetitively Pulsed Discharges *Katherine Opacich - UD* *Joshua S. Heyne - UD* *Stephen D. Hammack - AFRL* *Timothy Ombrello - AFRL*	*48DCASS-097* Development of Three New Fluidic Oscillators *Kyle Zarwanski - AFIT* *Marc D. Polanka - AFIT* *Brian T. Bohan - AFIT*	*48DCASS-119* An Investigation of the Mechanics of an Ultra-Stretchable, Self-Healing, DLP 3D-Printed Hydrogel for Damage-Resistant Soft Robots *Joshua Michonski - UD* *Joseph Beckett, Robert Lowe - UD* *Carl Thrasher - MIT* *Braeden Windham, Allyson Cox, Timothy Osborn - UDRI*	*48DCASS-076* A Novel Methodology to Validate Numerical Data to PIV Data *Dilip Kalagotla - UC* *Paul Orkwis - UC*	*48DCASS-003* Multi-Fidelity Kriging and Sparse Polynomial Chaos Surrogate Models Applied to Uncertainty Quantification *Markus Rumpfkeil - UD*	*48DCASS-112* Application of Mixed-Reality to Single-Pilot Control of Multi-Agent UAS *Liam Mckenna - UC* *Rajnikant Sharma - UC*	*48DCASS-057* Towards Improved Resiliency in Humanoid Space Robotics Operations *Matthew Verbryke - UC* *Catharine McGhan - UC*	*48DCASS-136* A Thermal Conductivity Measurement in Fibrous Insulation Materials *James Senig - UKY* *John F. Maddox - UKY*
3:00 PM	Break								

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AIAA Dayton-Cincinnati Section

48th Dayton-Cincinnati Aerospace Sciences Symposium

	Room 131	Room 171	Room 116	Room 127	Room 133	Room 164	Room 120	Room 150	Room 119
	SESSION 24 **Applied Computational Fluid Dynamics** Chair: Matthew Tufts *AFRL*	SESSION 25 **Unmanned Aerial Systems** Chair: Michael Zollars *AFIT*	SESSION 26 **Fluid Dyanmics III** Chair: Annie Price *AFRL*	SESSION 27 **Materials & Structures II** Chair: Robert Lowe *UD*	SESSION 28 **High School** Chair: Dilip Kalagotla *UC*	SESSION 29 **Aircraft Aerodynamics II** Chair: Mark Reeder *AFIT*	SESSION 30 **Flight Dynamics & Controls III** Chair: Jose A. Camberos *AFIT*	SESSION 31 **Space Systems III** Chair: Anil Patnaik *AFIT*	SESSION 32 **Heat Transfer 2** Chair: Marc Polanka *AFIT*
Time									
3:20 PM	*48DCASS-005* Wall-Resolved Large-Eddy Simulation of Smooth-Body Separated Flow *Donald Rizzetta - AFRL* *Daniel Garmann - AFRL*	*48DCASS-027* Impact of Cell Chemistry on Vehicle Performance for Urban Air Mobility *Matilde D'arpino - OSU* *Faissal El Idrissi - OSU* *Michael Grau - OSU*	*48DCASS-006* Experimental and Numerical Studies on the Projective Dye Visualization Velocimetry in a Squared Vertical Tube *Mark Johnson - WSU* *Hang Yi - WSU* *Zifeng Yang - WSU*	*48DCASS-085* Investigation into micro-structural characteristics of Bourbon barrel materials *Jaden Kim - UKY* *Savio Poovathingal - UKY*	*48DCASS-022* Enabling High Efficiency Broadband MIR Gratings through Advanced Lithography *Trevor Chen - SE* *Bangzhi Liu - PSU* *Chad Eichfeld - PSU* *Daniel Thul - SE* *Paul S. Hsu - SE*	*48DCASS-013* Computational Fluid Dynamics Aerodynamic Performance Predictions for a Subsonic Swept Wing *William Humphrey - AFRL* *Rick Graves - AFRL*	*48DCASS-045* Investigating the Performance of Different Controllers in Optimized Path Tracking using Turtlebot3 robot: A Lie Bracket System Approach *Shivam Bajpai - UC* *Ahmed Elgohary - UC* *Sameh A. Eisa - UC*	*48DCASS-025* Statistical Reliability Estimation for Deep Space Satellites Operating from 1991-2020 *Travis Grile - AFIT* *Lt Col Robert Bettinger - AFIT*	*48DCASS-089* A Multi-Physics Approach to Modeling Thermoelectric Generators in Hypersonic Flows *Rydge Mulford - UD* *Schaiper, Spencer - UD* *Mulford, Rydge B. - UD* *Crowe, Darrell - AFIT*
3:40 PM	*48DCASS-007* Developing a 3D In-vitro Validated In-silico Cerebral Aneurysm Model using Non-Newtonian Blood Analogues *Hang Yi - WSU* *Zifeng Yang, Mark Johnson - WSU* *Luke Bramlage, Bryan Ludwig - MVH*	*48DCASS-028* Characterization of Li-ion Batteries under Low Pressure for Electric Air Mobility *Matilde D'arpino - OSU* *Faissal El Idrissi - OSU* *Emanuele Gravante - OSU* *Prashanth Ramesh - OSU*	*48DCASS-077* Computational Analysis of Jet Plume *Conrad Kramer - AFIT*	*48DCASS-099* An Experimental Investigation of the Impact of Stretch on Permittivity in Dielectric Elastomers *Aimable Kazintwari - UD* *Elizabeth Shafer, Zachary Kranz, Alexander Watson, Robert Lowe - UD* *Christopher Cooley - OKU*	*48DCASS-087* Compact LWIR Probe for Engine Surface Temperature Measurement *Awnik Roy - TMVS* *Paul Hsu - SE* *Trevor Chen - SE* *Andy Zhang - SE*	*48DCASS-019* Experimental Investigation of a Novel Morphing Wing Design *Julian Pabon - UD* *Xinyu Gao - UD* *Jielong Cai - UD* *Siddard Gunasekaran - UD*	*48DCASS-129* Precise navigation for last-mile deliveries in Advanced Air Mobility framework with unreliable GPS *Anuraga Sankepally - UC* *Rohith Boyinine - UC* *Anusna Chakraborty - UCC* *Rajnikant Sharma - UC*	*48DCASS-066* TDOA/FDOA Receiver Architecture Analysis for Cislunar Object SSA *Kullen Waggoner - AFIT* *David Curtis - AFIT* *Bryan Little - AFIT*	*48DCASS-037* Validation of the reverse Monte Carlo ray-tracing method and coupling with material response *Ahmed Yassin - UKY* *Savio J. Poovathingal - UKY*
4:00 PM	*48DCASS-061* Machine Learning for Angiography-Based Blood Flow Velocity Prediction *Swati Padhee - WSU* *Mark Johnson, Hang Yi, Zifeng Yang, Tanvi Banerjee - WSU WSU*	*48DCASS-048* Modular Genetic Fuzzy Control for Payload Stabilization and Obstacle Avoidance for a UAV Payload system in Constrained Indoor Environments *Akshay Elangovan - UC* *Catharine McGhan - UC*	*48DCASS-124* Liquid Drop Impact: Computational and Analytical Studies *Murat Dinc - MU*	*48DCASS-108* Mechanical Characterization of High-Temperature Fluoroelastomers *Brent Johnson - UD* *Allyson Cox, Timothy Osborn - UDRI* *Chad Jones, Robert Gray - MVC* *Robert Lowe - UD*	*48DCASS-123* Computational Fluid Dynamic (CFD) Analysis and Experimental Test of Ping Pong Parachute Event Design for National Science Olympiad Tournament *Grace Chi - MOS* *Jason Wang - MOS* *Zifeng Yang - WSU*	*48DCASS-014* CFD Investigation of the Small Tactical Air Refueling Boom (STARBoom) *John Staiger - AFRL*	*48DCASS-018* Force Design in the Dark: An Introduction to Integrated Aerial Rearming & Refueling *Rick Graves - AFRL*	*48DCASS-075* Optimal Gyroid Infill For Space Launch *Jose Lopez-cordell - AFIT* *Carl Hartsfield - AFIT*	*48DCASS-060* Estimating effective radiative properties of elastomeric silicone through surrogate modeling *Ayan Banerjee - UKY* *Ahmed H Yassin - UKY* *Savio J Poovathingal - UKY*
4:20 PM	*48DCASS-042* Application of a Multiphase Diffuse Interface Method for High Speed Flows with Phase Change *Tyler Stoffel - UKY* *Manuel Viqueira-Moreira - UMD* *Christoph Brehm - UMD* *Savio J. Poovathingal - UKY*	*48DCASS-095* Optimized Fuzzy Inference System-based Three-dimensional Collision Avoidance Algorithm for Fixed-wing UAVs *Shyam Rauniyar - UC* *Donghoon Kim - UC*	*48DCASS-139* High Amplitude Lift Tracking Using Closed-Loop Feedback and Control: A Flow Analysis *Michael Mongin - AFRL* *Sidaard Gunasekaran - UD* *Andrew Killian - UD* *Albert Medina - AFRL*	*48DCASS-118* Sensitivity-Weighted Mesostructure Selection within a Multiscale Topology Optimization Framework *Edward Meixner - UD* *Brent Bielefeldt - NRC* *Richard Beblo - AFRL* *Robert Lowe - UD*	*48DCASS-115* Exploring Targeted Weakening of Hurricanes and Tropical Cyclones *Aditya Patnaik - BHS* *Major Peter A. Saunders - AFIT*	*48DCASS-044* The two centuries-long mystery of the optimized flight physics of soaring birds is finally decoded: a radical extremum seeking system and differential *Sameer Pokhrel - UC* *Sameh A. Eisa - UC*	*48DCASS-135* Deep Q-Learning Based Search of a Ground Target in a grid with erroneous partial information *Srikanth Elkoori Ghantala* *Karnam - UC* *Rajnikant Sharma - UC*	*48DCASS-086* Kentucky Aboard RockSat (KARS): A Suborbital Flight Experiment *Kirsten Ford - UKY* *Alexandre Martin - UKY* *Savio Poovathingal - UKY* *Matt Ruffner - UKY* *Bruno Tacchi - UKY*	*48DCASS-067* Heat and Mass Transfer Study of High-pressure Membrane Dehumidifier Under Varying Sweep Conditions *Danielle Hollon - AFRL* *Abdeel Roman - AFRL* *Mitch Wolff - WSU*
4:40 PM					*48DCASS-107* Investigating the Effectiveness of Natural Antibiotics vs. Pharmaceutical Antibiotics *Heera Nair - BBHS*				
5:00 PM	Adjourn								

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We are always looking for new Council Members. Contact any of our current officers listed below or via our web site at: https://engage.aiaa.org/Dayton-Cincinnati/home
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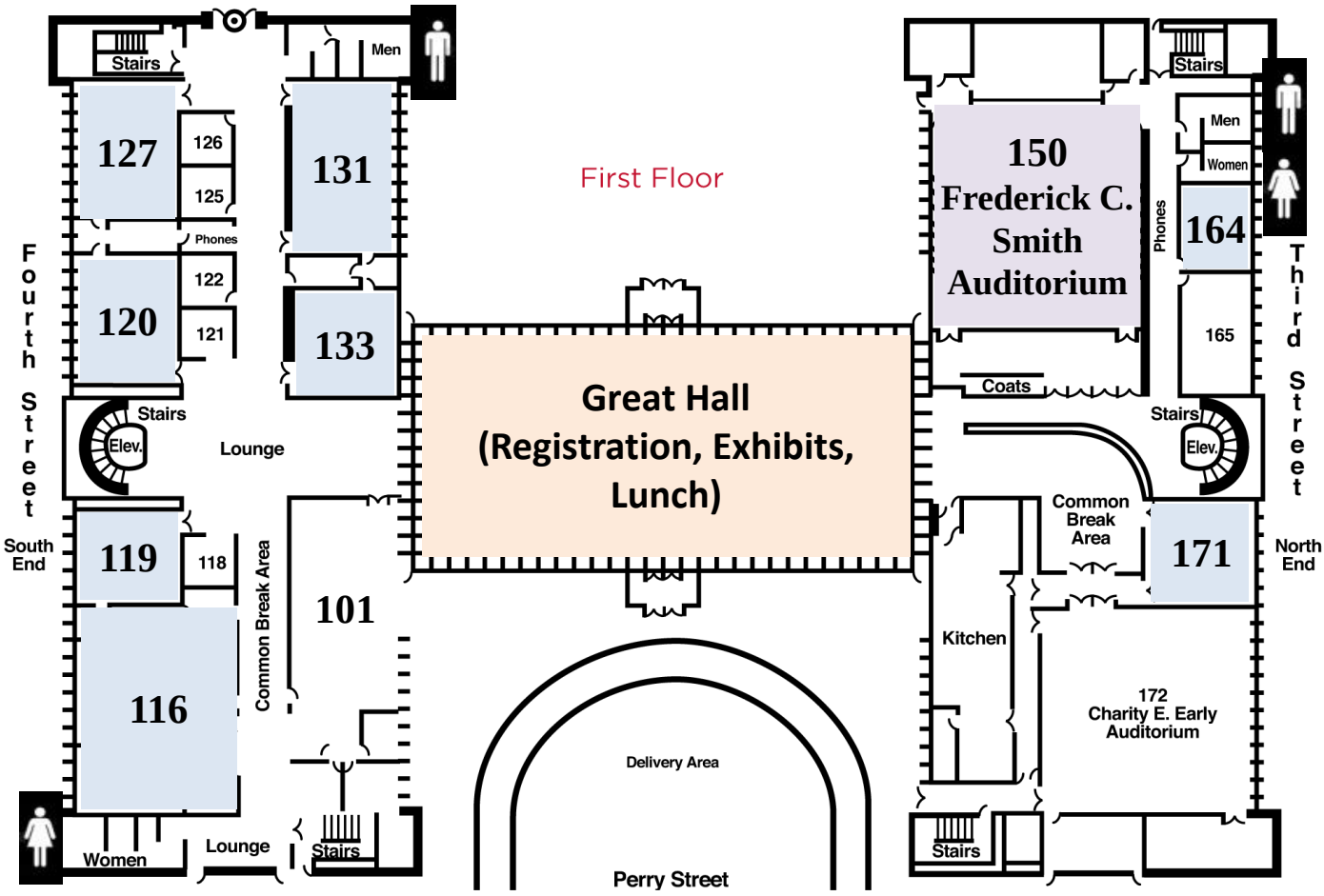

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