AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS
DAYTON-CINCINNATI SECTION

SYMPOSIUM GUIDE

The Fifty-First Annual

Dayton-Cincinnati Aerospace Sciences Symposium



Photo Courtesy of Dr. Parker Vascik

Keynote Program: Progress, Lessons, and Prospects for Hybrid-Electric Aircraft Propulsion Today and to 2050

10 March 2026

Sinclair Ponitz Conference Center

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

AIAA Student Sections: Air Force Institute of Technology, California State Polytechnic University Pomona, Carnegie-Mellon University, Cedarville University, Clarkson University, Florida State University, Miami University, Ohio State University, Purdue University, Saint Louis University, University of Alabama, University of Cincinnati, University of Dayton, University of Kentucky - Lexington, University of Kentucky - Paducah, University of Michigan, Wright State University

Welcome

to the
51st AIAA Dayton-Cincinnati Aerospace Sciences Symposium (DCASS)

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Welcome to the 51st Dayton-Cincinnati Aerospace Sciences Symposium (DCASS). Whether this is your first DCASS or your 51st, we thank you for participating. Last year, we celebrated the symposium's 50th anniversary; this year, we begin another 50 years of excellence, highlighting advances in aerospace science and continuing to serve as a unique forum for our regional aerospace community.

Today, we hope you attend the diverse technical presentations submitted by our region's aerospace professionals, students, and academics, highlighting scientific research and engineering innovations, get a chance to catch up with some old colleagues and meet new collaborators, and help promote Science, Technology, Engineering, and Mathematics (STEM) in the region.

As we mark our 51st symposium, we highlight the double meaning of **LI**—the Roman numeral for **51** and the atomic symbol for **Lithium**—to celebrate the advances in hybrid electric propulsion and the region's investment in advanced air mobility. To highlight this theme, our keynote speaker, **Dr. Parker Vascik** – Director of Product Strategy at Electra, will give a lecture on how recent advancements in mobility electrification have opened a revolutionary third era of aircraft design promising step changes in aircraft performance, efficiency, and cost.

We would like to extend a special thank you to our sponsors: **DEWESoft, Parallax Advanced Research, GE Aerospace, Innovative Scientific Solutions, Inc, Kalindha Rashmi, and Spectral Energies**. Without their gracious support this year and years past, this symposium would not be possible. Please take a moment to visit the sponsor exhibits in the Great Hall to learn about their impactful work and thank them for their continued support of DCASS.

We also wish to thank the group of dedicated volunteers who work throughout the year to make this symposium a success. This meeting is only possible through the efforts of these passionate individuals serving AIAA and the local aerospace community. We also thank the Dayton-Cincinnati AIAA Section and national AIAA leadership.

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, scheduled for May 2026. Stay tuned for details and plan to attend!

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

Drs. Christopher Ruscher & Joseph Miller

2026 DCASS Executive Chair & Co-Chair

2026 DAYTON-CINCINNATI SECTION AWARDS

CALL FOR NOMINATIONS

Recognize the achievements of your colleagues. The local Awards Banquet is going to be held on May 20th 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 **10 April 2026** to:

Dr. Marc Polanka
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 8:00 AM – 9:40 AM

1	Computational Fluid Dynamics 1	Room 116
2	Fluid Dynamics of Jets, Sprays, & Propellers	Room 119
3	High Temperature Heat Transfer & TPS	Room 120
4	Machine Learning for Aerospace Applications I	Room 127
5	Materials for Extreme Environments	Room 133
6	Rotating Detonation Combustors	Room 171
7	Space Systems & Robotics	Room 262
8	UAS & High Speed Vehicle Design	Room 282

Second Block 10:00 AM – 11:20 AM

9	Acoustics	Room 116
10	Propulsion System Fluidics	Room 119
11	Thermal Management Systems	Room 120
12	Digital Engineering & Accelerated CFD	Room 127
13	Materials & Structures: Modeling & Validation	Room 133
14	Advanced Propulsion & Power Concepts	Room 171
15	Spacecraft Design	Room 262
16	Shock Waves	Room 282

Keynote Program in Frederick C. Smith Auditorium (Room 150) 11:30 AM – 12:40 PM

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

Third Block 1:40 PM – 3:20 PM

17	Unsteady & Turbulent Flow Dynamics	Room 116
18	Film Cooling & Thermal Protection	Room 119
19	Supersonic & Hypersonic Flow	Room 120
20	Machine Learning for Aerospace Applications 2	Room 127
21	Composite Materials & Analysis	Room 133
22	Combustion, Pulse Jets & Thermophysics	Room 171
23	Data Analysis & Uncertainty Quantification	Room 262
24	Heat Exchanges & Two-Phase Flow	Room 282

Fourth Block 3:40 PM – 5:20 PM

25	Computational Fluid Dynamics 2	Room 116
26	Flow Control & Analysis	Room 119
27	Combustion Stability & Thermoacoustics	Room 120
28	Propulsion Systems & Diagnostics	Room 127
29	Additively Manufactured Structures	Room 133
30	Aerospace Education	Room 171
31	Spaceflight Dynamics	Room 262
32	Flight Dynamics & Control Systems	Room 282

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
Aerodynamics	9, 16, 17, 19	Fluid Dynamics	1, 2, 10, 25
Air & Space Vehicle Technology	8, 14, 26, 32	Heat Transfer & Thermal Management	3, 11, 18, 24
Combustion & Propulsion	6, 22, 27, 28	Materials & Structures	5, 13, 21, 29
Digital Engineering & Machine Learning	4, 12, 20, 23	Space Systems & Dyanmics	7, 15, 31

Session Chairs will provide scores based on the 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

51st Dayton-Cincinnati Aerospace Sciences Symposium

Time	Room 116	Room 119	Room 120	Room 127	Room 133	Room 171	Room 262	Room 282
	SESSION 1 **Computational Fluid Dyanmics 1** Chair: Donald Rizzetta *AFRl*	SESSION 2 **Fluid Dyanmics of Jets, Sprays & Propellers** Chair: Carl Tilmann *AFRL*	SESSION 3 **High Temperature Heat Transfer & TPS** Chair: Mark Mcquilling *SLU*	SESSION 4 **Machine Learning for Aerospace Applications 1** Chair: Yashvi Srivastava *HSEO*	SESSION 5 **Materials for Extreme Environments** Chair: Tahseen Al-wattar *CSU*	SESSION 6 **Rotating Detonation Combustors** Chair: Marc Polanka *AFIT*	SESSION 7 **Space Systems & Robotics** Chair: Carl Hartsfield *AFIT*	SESSION 8 **UAS & High Speed Vehicle Design** Chair: Kerry Hicks *AFIT*
8:00 AM	*51DCASS-003* Tackling the Aerostructural Optimization Benchmark Problem with a Multi-Fidelity Gradient-based Approach *Markus Rumpfkeil - UD*	*51DCASS-032* A Mesoscale Framework for Gas–Surface Fluid–Thermal Interactions in Hypersonic Flows *Caeden Burcham - UKY* *Vijay Mohan - UKY* *Savio Poovathingal - UKY*	*51DCASS-029* Trajectory Scale Fluid-Thermal Analysis in the Gap Region of a High-Speed Control Surface *Jon A. Willems Jr. - AFRL* *Jack J. McNamara - OSU* *Daniel Reasor Jr., Thomas Mason - AFRL* *Chris Weston, Carlos Cesnik - UM*	*51DCASS-019* Design of Reinforcement Learning Curriculum for Helicopter Autorotation Control Agent *Matthew Thompson - AFIT*	*51DCASS-024* Advancements in carbon conductors for extreme aerospace environments *John Bulmer - AFRL* *Kadyn Tackett, Charlie Ebbing, Brice Hall, Jake Blue, Sabrina Eddy - AFRL* *Mary-Ann Sebastian, Chris Kovacs, Tom Bullard, Timothy Haugan - AFRL*	*51DCASS-081* Rotating Detonation Engine Flame-holding *Tyler Pritschau - UC* *Ephraim Gutmark - UC*	51DCASS-052 Compensating Disturbance to the Base Spacecraft using the Second Arm for a Dual-Arm Space Robotic System *James Talavage - UC* *Andrew Barth - UC* *Ou Ma - UC*	51DCASS-034 Efficient Goal-Oriented Evasion via Dynamic Basic Engagement Zone Maneuvers *Alexander Denton - AFIT* *Donald Kunz - AFIT*
8:20 AM	*51DCASS-018* Numerical Investigations of Supersonic Cavity Flows With Novel Door Configurations *Skyler Baugher - OSU* *Datta V. Gaitonde - OSU*	*51DCASS-070* Evaluation of Taylor's Frozen Flow hypothesis and the Elliptic Approximation model in turbulent free jets using 100-kHz, 2D Particle Image Velocimetry *Madelyn Torrans - CU* *Seth K. Mitchell - CU* *Joseph D. Miller - CU*	*51DCASS-038* Numerical Modeling of a Heat Shield for Rocket Cargo *Dylan Viveros - AFIT*	*52DCASS-043* Implicit Realizability Enforcement in Machine Learning-assisted Turbulence Modeling *James Wnek - WSU* *Mitch Wolff - WSU* *Christopher Schrock - AFRL* *Eric Wolf - OAI*	*51DCASS-061* Mechanical and Interface Properties of Cu and Low-Dimensional Carbon Nanocomposites *Arun Nair - AFIT* *Abigail Eaton - AC*	*51DCASS-089* Recurrence Analysis of a Rotating Detonation Engine During Unstable Operation *Peter Glaubitz - UC* *Yuvi Nanda - UC* *Ephraim Gutmark - UC*	*51DCASS-105* Reaction Wheel-Equipped 3-DOF Air-Bearing Testbed for Zero-Speed Crossing Analysis *Ilyas Malik - UC* *Rajat Chadha - UC* *Ozair Kissana - UC* *Daegyun Choi - UC* *Donghoon Kim - UC*	*51DCASS-091* Conceptual Level Analysis and Design of Hypersonic Missiles with High-Speed Air-Breathing Propulsion Systems *Madison Sellers - AC* *Joy Trimbach - AFIT* *José Camberos - AFIT* *Mitch Wolff - WSU*
8:40 AM	*51DCASS-021* Development of a Coupled Framework for Solving Non-Continuum Fluid-Structure Interaction Problems *Robbie Harper - UKY* *Ethan Huff - UKY* *Ahmed Yassin - UKY* *Savio Poovathingal - UKY*	*51DCASS-115* Characterization of Rotary Atomizer Spray Geometry Under the Influence of a Propeller *Brock Greenwood - UD* *Abdul Khan - UD* *Megan Bender - UD* *Siddard Gunasekaran - UD*	*51DCASS-071* Development and Testing of an Oxy-Fuel Burner for Engine-Representative Blade Tip Rub Experiments *Gabriel Jackson - OSU* *Randall M. Mathison - OSU* *Kiran D'Souza - OSU*	*51DCASS-093* Neural Network-Based Adaptive Control Gain Adjustment for IntroSAT *Chun-kai Yang - UC* *Daegyun Choi - UC* *Donghoon Kim - UC*	*51DCASS-062* Oxidation and Mechanical Properties of Low Dimensional Materials *Arun Nair - AFIT* *Ebin Thomas - AFIT* *Abigail Eaton - AC*	*51DCASS-099* Interaction of Hydrogen-Fueled Rotating Detonation Wave with Ethylene Core Combustion *Anthony Centofanti - UC* *Ephraim Gutmark - UC*	*51DCASS-114* Experimental Validation of Dynamic Coupling Effects Using the Reconfigurable Space Manipulator Testbed *Rajat Chadha - UC* *Daegyun Choi - UC* *Donghoon Kim - UC* *Gargi Das - UC* *Diego Quevedo - UC*	*51DCASS-125* A Comparative Study of Multimodal Cyber Physical Alarms *Nermeen Saleh - WSU* *Hugh Salehi - WSU*
9:00 AM	*51DCASS-058* Comparing sharp and diffused interface methods for high-speed droplet deformation *Achyut Panchal - UC*	*51DCASS-133* Experimental Investigation of a Variable Collective Pitch Propeller in Near Edgewise Flight *Samuel Parlett - UD* *Jielong Cai - WPI* *Michael V. OL - CSPU* *Sidaard Gunasekaran - UD*	*51DCASS-092* Supercritical Energy Extraction Kinetics (SEEK) Turbopump Expansion Cycle Analysis *Liam Hackett - WSU* *Mitch Wolff - WSU* *Justin DelMar - AFRL*	*51DCASS-108* Characterization and Confidence-based Adaptive Machine Learning for Conceptual Aerospace Vehicle Design *Ethan Cawley - AFIT* *Timothy Massie - WSU* *Harok Bae - WSU* *Jose A. Camberos - AFIT* *Ramana V. Grandhi - AFIT*	*51DCASS-068* Size-Weight-and-Power Analysis of Magnetic Systems for Aerospace Magnetohydrodynamic Power Generation *Chris Kovacs - SSL* *Levi Elston - AFRL* *John Bulmer - NRC* *Timothy Haugan - AFRL*	*51DCASS-100* Methods of Increasing RDE-Core Flow Interaction in a Flow Through Geometry *Brice Martinelli - UC* *Ephraim Gutmark - UC*	*51DCASS-126* Evaluation of a Space Manipulator-Based Throwing Strategy for Satellite Servicing *Sarah Hudson - UC* *Diego Quevedo - UC* *Donghoon Kim - UC*	*50DCASS-141* System-Level Validation of Dynamic Wireless Power Delivery to Electric Aerospace Platforms Using a Leaky-Wave Antenna *Michael Rogers - WSU* *Yan Zhuang - WSU*
9:20 AM	*51DCASS-066* Development of a framework for modeling fluid/surface interactions with surface recession using ISTHMUS *Levi Cary - MUS* *Caeden Burcham - UKY* *Vijay B. Mohan Ramu - UKY* *Savio J. Poovathingal - UKY* *Tyler D. Stoffel - MUS*	*51DCASS-137* Influence of Jet Pitch Angle and Pulse Frequency on Jet-in-Crossflow Flow Characteristics *Laura Senkar - UC* *Daniel Cuppoletti - UC*	*51DCASS-139* Experimental Orthotropic Thermal Conductivity Measurements in FiberForm *James Senig - UKY* *John F. Maddox - UKY*	*51DCASS-117* The Effect of Fatigue on Multitasking Performance in Automated Operational Environments *Stacie Severyn - WSU* *Hugh Salehi - WSU* *Cogan Shimizu - WSU* *Elizabeth Fox - AFRL*	*51DCASS-112* Degradation of patterned polymeric materials in Very Low Earth Orbit (VLEO) *Shreya Pokharel - UKY* *Savio Poovathingal - UKY* *Christine Trinkle - UKY*	*51DCASS-138* Heat Flux Characterization of Rotating Detonation Engine Configurations *Dylan Lawrence - UC* *Ephraim Gutmark - UC*	*51DCASS-132* Impedance Control Model Identification For A Free-Flying Space Robot Manipulating A CubeSat *Diego Quevedo - UC* *Donghoon Kim - UC*	
9:40 AM	Break							

Abbreviations:

AC = AFIT Contractor
AFIT = Air Force Institute of Technology
AFLCMC = Air Force Life Cycle Management Center
AFRL = Air Force Research Laboratory
ARO = Army Research Office
CLKU = Clarkson University
CMU = Carnegie-Mellon University
CSPU = California State Polytechnic University Pomona
CSU = Central State University
CU = Cedarville University
FSU = Florida State University
GISA = Global Impact STEM Academy
HSEO = Helium SEO
ISSI = Innovative Scientific Solutions Inc.
LTU = LeTourneau University
MU = Miami University
MUS = Murray State University
NGRC = NASA Glenn Research Center
NRC = National Research Council
OAI = Ohio Aerospace Institute
OSU = The Ohio State University
PAR = Parallax Advanced Research
PU = Purdue University
QSI = QubitSolve Inc.
SBHS = Stebbins High School
SLU = St. Louis University
SSL = Scintillating Solutions LLC
UAT = The University of Alabama
UC = University of Cincinnati
UCSC = University of California, Santa Cruz
UD = University of Dayton
UDRI = University of Dayton Research Institute
UKY = University of Kentucky
UM = University of Michigan
WPI = Worcester Polytechnic Institute
WSU = Wright State University

AIAA DAYTON-CINCINNATI SECTION

51st Dayton-Cincinnati Aerospace Sciences Symposium

Time	Room 116	Room 119	Room 120	Room 127	Room 133	Room 171	Room 262	Room 282
	SESSION 9 **Acoustics** Chair: Neal Novotny *AFRL*	SESSION 10 **Propulsion System Fluidics** Chair: Troy Hoeger *AFLCMC*	SESSION 11 **Thermal Management Systems** Chair: Jon Willems *AFRL*	SESSION 12 **Digital Engineering & Accelerated CFD** Chair: Robert Bettinger *AFIT*	SESSION 13 **Materials & Structures: Modeling & Validation** Chair: Abigail Eaton *AFIT*	SESSION 14 **Advanced Propulsion & Power Concepts** Chair: Connor Wiese *AFIT*	SESSION 15 **Spacecraft Design** Chair: George Landon *CU*	SESSION 16 **Shock Waves** Chair: Nicholas Bisek *AFRL*
10:00 AM	*51DCASS-067* Effect of Controlled Surface Roughness on the Jet Screech *Kaurab Gautam - UC* *Ephraim Gutmark - UC*	*51DCASS-069* Investigating Buoyancy Effects in Unsteady Rim Seal Structure Formation *Evan Sears - OSU* *Randall M. Mathison - OSU*	*51DCASS-064* Next-Generation Polymer Aerogel Insulation for Cryogenic Applications *Sadeq Malakooti - NGRC* *Stephanie L. Vivod, Wesley L. Johnson, Vadim Lvovich - NGRC* *Gitogo Churu, Jonathan Demko - LTU*	*51DCASS-030* Algorithmic and Precision Tradeoffs in GPU-Accelerated CFD Solvers *Maya Sivakumaran - OSU* *Datta V. Gaitonde - OSU*	*51DCASS-035* Design and Optimization of Spherical and Cylindrical Void-Based 3d Phononic Metamaterials for Wide Elastic Bandgap and Enhanced Mechanical Properties *Md Aniruddah Alam - MU* *Mehdi Zanjani - MU* *Muhammad Jahan - MU*	*51DCASS-087* Visual Servoing-Based Autonomous Landing on Austere Runways *Liam Mckenna - AC* *Clark Taylor - AFIT* *Jeremy Gray - AC* *Jason Bowman - AFRL*	*51DCASS-050* An ISRU-Based Lunar Architecture for Monthly Lunar Sample Returns *Clark Zhang - UM* *Marloes van de Zwart - UM* *Adrien Boissy - UM* *Rabhya Gupta - UM* *Jeremy Glende - UM*	*51DCASS-014* Effects of Duct Aspect Ratio on Shock Train Behaviors *Jack Sullivan - OSU* *Datta V. Gaitonde - OSU*
10:20 AM	*51DCASS-085* Noise Reduction Utilizing Slot Style Injectors in Rectangular Nozzles *James Cramer - UC* *Ephraim Gutmark - UC*	*51DCASS-116* Additive Manufactured Turbomachinery Compressor Performance Study *Patrick Martens - WSU* *Mitch Wolff - WSU* *Michael List - AFRL*	*51DCASS-073* Heat Transfer Performance of Supercritical CO2 Under Variable Gravity *Jalen Reed – UDRI* *Andrew J. Schrader - UD* *Jared R. McCoppin - UDRI* *Justin Delmar - AFRL*	*51DCASS-086* Deformation Behavior of Composites Under Impact Loading *John Halus - AFIT* *Jose Camberos - AFIT*	51DCASS-063 Selective Laser Sintering Based Additive Manufacturing of Nylon 12 Novel Hybrid Lattice Structures for Improved Compressive Strength *Arun Nair - AFIT* *Aidan McCarley - AFIT*	51DCASS-120 Capabilities and Applications of a Flexible Lubrication Bearing Test Rig *Andrew Hatton - ISSI* *Curtis Rice - ISSI* *Robert Sadinski - AFRL* *Justin Reinhart - AFRL* *Matthew Boehle - AFRL*	51DCASS-056 LEOPARDSat-1: Preliminary Lessons from a Student-Led CubeSat Project *Matthew Verbryke - UC* *Samuel Kohls - UC* *Nathan Nguyen - UC* *Michael Carovillano - UC* *Donghoon Kim - UC*	51DCASS-028 Effect of Cross-Sectional Shape on Shock Train Behaviors *Nathanael Wendel - OSU* *Datta V. Gaitonde - OSU* *Stuart I. Benton - AFRL*
10:40 AM	*51DCASS-122* Effect of Upstream Geometry on Jet Noise and Flow Field of Trapezoidal Nozzles *Andrew Russell - UC* *Ephraim Gutmark - UC*	*51DCASS-080* Analysis of TARS Open-Reactive Flow Temperature Distribution Using Background Oriented Schlieren *Grace Fischer - UC* *Shyam Muralidharan - UC* *Ephraim Gutmark - UC*	*51DCASS-103* Development of Quality-Driven Control Framework for Two-Phase Flow Pump Loop *Colin Fokine - WSU*	*51DCASS-107* Towards Accelerated CFD for Hypersonic Vehicle Analysis *Brandon Smith - PAR* *Lauren Mackey - PAR* *Oliver Stolley - PAR*	*51DCASS-084* Characterizing and Modeling the Resin-Fiber Interaction of PICA Using FIB-SEM *Shreya Pokharel - UKY* *Luis Chacon, Savio Poovathingal, Ph.D - UKY*	*51DCASS-123* Phase Retrieval-based Aero-Optic Compensation using Coherent Beam Combined Arrays *Alex Harms - AFIT* *Matthew Kemnetz - AFIT* *Matthais Banet - AFRL* *Jack McCrae - AFIT* *Rachel Oliver - AFIT*	*51DCASS-060* Conceptual Design of a Low-Cost Dual-Satellite Communication Network for the Cislunar Region *Matias Ramirez Cisternas - AFIT* *Rachel M. Derbis - AFIT*	*51DCASS-048* Dimensional Analysis of Oblique Shock Waves in Rectangular Channels *Liam Feldmeier - SLU* *Liam Simmons - SLU* *Letícia Pacheco - SLU* *Mark McQuilling - SLU*
11:00 AM	*51DCASS-142* Noise Effects of Fluidic Injection Channels and Perforated Fluidic Injection *Jacob Beach - UC* *Ephraim Gutmark - UC*		*51DCASS-145* Utilizing Liquified-Hydrocarbon and Liquid-H2 Fuels to Increase the Cooling-Capacity of Aerospace Platforms *Timothy Haugan - AFRL* *Chris J. Kovacs - SSL* *Leila Parsa - SSL* *Keith A. Corzine - SSL* *Saeid Saeidabadi - UCSC*	*51DCASS-144* Implementing a Digital Repository for Air Vehicle Analysis, Design, and Decision Making *Samuel Atchison - AC* *Jack Bruer - AFIT* *Jose Camberos - AFIT*	*51DCASS-104* Toward Substrates with Embedded Strain Isolation: Property Design Space Exploration of a 3D-Printable Self-Healing Elastomer *Max Drexler - UD* *Adin Stoller, Alex Watson, Robert Lowe - UD* *Allyson Cox - UDRI*	*51DCASS-131* Hypersonic Flow Computations with Kestrel CFD Solver *Rakesh Ranjan - UDRI* *Nicholas Bisek - AFRL*	*51DCASS-078* Separable Cislunar Nanosat Mechanism for On-Orbit Dynamic Reconfiguration Section: Space Systems *John Spann - AFIT* *Rachel M. Derbis - AFIT* *John S. Brewer - AFIT*	
11:20 AM	Break							
11:30 AM	KEYNOTE PROGRAM (see next page for details)							
12:40 PM	Lunch Break							

Abbreviations:

AC = AFIT Contractor
AFIT = Air Force Institute of Technology
AFLCMC = Air Force Life Cycle Management Center
AFRL = Air Force Research Laboratory
ARO = Army Research Office
CLKU = Clarkson University
CMU = Carnegie-Mellon University
CSPU = California State Polytechnic University Pomona
CSU = Central State University
CU = Cedarville University
FSU = Florida State University
GISA = Global Impact STEM Academy
HSEO = Helium SEO
ISSI = Innovative Scientific Solutions Inc.
LTU = LeTourneau University
MU = Miami University
MUS = Murray State University
NGRC = NASA Glenn Research Center
NRC = National Research Council
OAI = Ohio Aerospace Institute
OSU = The Ohio State University
PAR = Parallax Advanced Research
PU = Purdue University
QSI = QubitSolve Inc.
SBHS = Stebbins High School
SLU = St. Louis University
SSL = Scintillating Solutions LLC
UAT = The University of Alabama
UC = University of Cincinnati
UCSC = University of California, Santa Cruz
UD = University of Dayton
UDRI = University of Dayton Research Institute
UKY = University of Kentucky
UM = University of Michigan
WPI = Worcester Polytechnic Institute
WSU = Wright State University

51st AIAA Dayton-Cincinnati Aerospace Sciences Symposium

Please join us at 11:30 for the Keynote Program:

Welcome, Announcements:

DR. CHRISTOPHER RUSCHER

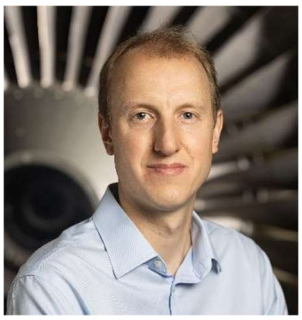
2026 DCASS Executive Chair

Keynote Address:

Progress, Lessons, and Prospects for Hybrid-Electric Aircraft Propulsion Today and to 2050

DR. PARKER VASCIK

Director of Product Strategy at Electra



Dr. Vascik's lecture will engage the audience in discussion about how the recent advancements in mobility electrification have opened a revolutionary third era of aircraft design promising step changes in aircraft performance, efficiency, and cost. Although the specific energy, cost, and real-world operational limitations of batteries excludes full-electric manned aircraft beyond short-range missions, the thoughtful application of electric propulsion complements conventional combustion engines and opens a wealth of new vehicle design opportunities.

For hybrid-electric propulsion, the devil is in the details. Dr. Vascik will use Electra's turbine-hybrid EL9 "Ultra Short" aircraft as a case study to discuss the implementation, limitations, and opportunities of hybridization today. Furthermore, Electra is leading a 25-year technology roadmapping study for NASA to provide leadership on how hybrid-electric powertrains will mature from small aircraft applications to regional jet and airliner concepts by 2050. Dr. Vascik will transition the discussion to brainstorm how future high-efficiency airframes with tightly integrated hybrid propulsion systems will enable optimization for efficiency, noise, and performance unreachable by conventional power trains.

Lastly, with nearly $20B invested in electrified aircraft during the past 10 years, dozens of credible new companies, and hundreds of new aircraft concepts, the third era of aviation is revitalizing the aeronautical engineering workforce pipeline and attracting the world's best talent back to the passion of flight. Aviation is having a Space-X moment and would be remiss to squander that once-in-many generations opportunity. Dr. Vascik will speak to the students concerning how their timing could not be better for career-defining programs, experiences, and impact.

Dr. Vascik is a systems engineer focused on the intersection of emerging technologies, business, and policy. While rapidly advancing technology is enabling the development of a new generation of increasingly electric and autonomous aircraft, Dr. Vascik concentrates on the critical role that the systems and economics surrounding aircraft operations play in their ultimate viability and time-to-market. Dr. Vascik completed his Ph.D. at MIT, as well as dual MS degrees in aerospace engineering and technology policy. His undergraduate was at Georgia Tech. He currently is a research engineer at MIT's International Center for Air Transportation and the director of product strategy for Electra. Dr. Vascik previously supported autonomy development programs at Joby Aviation and Xwing and was a nominated expert to ICAO CAEP working group 4 where he contributed to the development and sustainment of international environmental policies.

Time	Room 116	Room 119	Room 120	Room 127	Room 133	Room 171	Room 262	Room 282
	SESSION 17 **Unsteady & Turbulent Flow Dynamics** Chair: Donald Kunz *AFIT*	SESSION 18 **Film Cooling & Thermal Protection** Chair: Rolf Sondergaard *AFRL*	SESSION 19 **Supersonic & Hypersonic Flow** Chair: Joseph Miller *CU*	SESSION 20 **Space Systems & Robotics** Chair: Sadeq Malakooti *NGRC*	SESSION 21 **Machine Learning for Aerospace Applications 2** Chair: John Brewer *AFIT*	SESSION 22 **Combustion, Pulse Jets & Thermophysics** Chair: Jacob Ahles *AFRL*	SESSION 23 **Data Analysis & Uncertainty Quantification** Chair: Donghoon Kim *UC*	SESSION 24 **Heat Exchangers & Two-Phase Flow** Chair: Timothy Haugan *AFRL*
1:40 PM	*51DCASS-036* Effect of Prescribed Panel Mode Shapes on a Compound-Swept Turbulent Shock–Wave/Boundary-Layer Interaction *Anshul Suri - OSU* *Datta Gaitonde - OSU* *Jack McNamara - OSU*	*51DCASS-011* Supersonic Film Cooling on a Flat Plate *Nicholas Medeiros - AFIT* *Marc D. Polanka - AFIT* *James L. Rutledge - AFIT*	*51DCASS-005* Aerodynamic Instability from a Partially-Closed Cavity in Hypersonic Flow *Elizabeth Benitez - AFRL* *Nicholas Bisek - AFRL*	*51DCASS-088* Generation of CFD Data for use by Physics-Informed Neural Network to Create Predictive Aeroheating Surrogate Model *Amy Cinnamon - AFIT* *Jose Camberos - AFIT*	*51DCASS-031* Fatigue Behavior of an Advanced C/SiC Composite with a [0/90/±45] Layup at Elevated Temperature *Hassan Khokhar - AFIT*	*51DCASS-095* Development of an Electrically Matching Boil-off Calorimeter for Thermophysical Property Measurement of CO2-Based Zeotropic Mixtures *Evan Fender - UDRI* *Justin Delmar - AFRL* *Jerod McCoppin - UDRI*	*51DCASS-001* Uncertainty Quantification for Transient Thermal Management *Rama S Gorla - AFIT*	*51DCASS-051* Additively Manufactured Increasingly Porous Radiator For Static Thermal Management *Kristen Ess - UD* *Rydge Mulford - UD*
2:00 PM	*51DCASS-044* Wake Structure of Upswept Afterbodies with Geometric Modifications *Jacob Biesinger - OSU* *Datta Gaitonde - OSU*	*51DCASS-015* Superposition of unsteady pulsed film cooling flow over an adiabatic plate through computational fluid dynamics *Matthew Knoedler - AFIT*	*51DCASS-020* Characterization of Instability Modes in Hypersonic Flow over a Cone-Cylinder-Flare *Chandan Kumar - OSU* *Unnikrishnan Sasidharan Nair - FSU* *Datta V. Gaitonde - OSU*	*51DCASS-094* Adaptive Multi-Fidelity Machine Learning for Nonlinear Buckling Prediction of Imperfect Cylindrical Structures *Samuel Salupo - WSU* *Harok Bae - WSU* *Mishal Thapa - CLKU* *Sameer Mulani - UAT*	*51DCASS-037* A permeability model for stochastic modeling of heat shields *Donghyun Kim - UKY* *Ayan Banerjee - UKY* *Luis Chacon - UKY* *Savio J. Poovathingal - UKY*	*51DCASS-101* Experimental Characterization of Pressure-Thrust Dynamics in a Valved Resonant Pulse Combustor *Remya M. Nair - UC* *Shubham U. Dhadhal - UC* *Ephraim Gutmark - UC*	*51DCASS-010* Computational Fluid Dynamics on Quantum Computers *Madhava Syamlal - QSI*	*51DCASS-009* Partially Catalytic Boundary Effects on Shock Boundary-Layer Interactions *Ariel Blanco - UDRI* *Nicholas J. Bisek - AFRL*
2:20 PM	*51DCASS-128* Cross-Stream PIV Characterization of the Prandtl-D3C Wake *Jessica Demoor - UD* *Charles B. Cain - UD* *Sidaard Gunasekaran - UD*	*51DCASS-016* Superposition of Unsteady Film Cooling Effectiveness Methods *Luke Wells - AFIT* *James L. Rutledge - AFIT* *Ethan A. Dean - AFIT*	*51DCASS-025* Generalized Mach formulation of Rossiter modes in subsonic to hypersonic cavities *Jeremy Redding - UC* *Prashant Khare - UC* *Luis Bravo - ARO*	*51DCASS-098* Analysis of Deep Neural Network Architecture for High Dimensional Non-Linear Spaces *Mark Bergman - WSU* *Harok Bae - WSU* *Karen Demille - AFRL*	*51DCASS-039* Tensile and Fatigue Behavior of an Advanced Quasi-isotropic C/SiC Composite at 1200ºC in Air *Nicholas Garbinski - AFIT* *Marina Ruggles-Wrenn - AFIT*	*51DCASS-121* Nanosecond pulsed discharges for ignition and flameholding in supersonic flows *Katherine Opacich - NRC* *Timothy Ombrello - AFRL*	*51DCASS-054* Calibration of the Saint Louis University Polysonic Wind Tunnel *Isabel Williams - SLU* *AJ Swartwout - SLU* *Mark McQuilling - SLU*	*51DCASS-055* Exploring the Feasibility of an SMA Torque Tube Heat Pipe for Combined Thermal Transport and Mechanical Actuation *Liam Gallagher - UD* *Rydge Mulford - UD*
2:40 PM	*51DCASS-135* Multi-Fidelity Analysis of a Supersonic Busemann Inlet *Christopher Humphrey - UC* *Luis Bravo - ARO* *Joseph D. Vasile - ARO* *Prashant Khare - UC*	*51DCASS-083* Compressibility Effects on Scaling Adiabatic Effectiveness *George Ip - AFIT* *James L. Rutledge - AFIT* *Connor J. Wiese - AFIT* *Marc D. Polanka - AFIT*	*51DCASS-027* Impact of Fins of the Unsteady Base Flow of a Supersonic Projectile *Steven Murawski - OSU* *Datta V. Gaitonde - OSU*	*51DCASS-129* Machine Learned Reynolds Stress Tensor Embedded into OpenFOAM *Lincoln Dehaven - WSU* *James Wnek - WSU* *Mitch Wolff - WSU* *Christopher Schrock - AFRL*	*51DCASS-097* Trace Lithium Isotope Analysis of the 2s-2p Doublets via Surface-Enhanced Nanosecond LIBS *Travis Morris - AFIT* *Anil Patnaik - AFIT*	*51DCASS-136* Control Valve Configuration Improvement for Ignition Rig *Elizabeth Koetter - UD*	*51DCASS-111* CFD-Based Performance Optimization of a Modified Savonius Wind Turbine *Vedant Buch - UC* *Myles Paul - UC* *Shaaban Abdallah - UC* *Bal Adhikari - UC* *Kaurab Gautam - UC*	*51DCASS-072* Development of a thermal solver to investigate phase change of atmospheric ice particles in hypersonic flows *Carlos Americo - UKY* *Ethan H. Huff - UKY* *Ahmed H. Yassin - UKY* *Savio J. Poovathingal - UKY*
3:00 PM	*51DCASS-140* Experimental Investigations of a Dual-Mode Skin-Actuated- Camber with Embedded Twist (SACET) Morphing Wing *Julian Pabon - UD* *Grace Schreyer - UD* *Grace Selm - UD* *Sidaard Gunasekaran - UD*	*51DCASS-012* Film Cooling Applied in a Rotating Detonation Engine *Alex Thordson - AFIT* *Marc D. Polanka - AFIT* *Mauro Tagliaferri - PU* *Matthew Longer - ISSI*	*51DCASS-033* Amplification Mechanisms in a Supersonic Dual-Stream Rectangular Jet *Mitesh Thakor - OSU* *Datta V. Gaitonde - OSU*	*51DCASS-134* Multi-Fidelity Machine Learning for Aerodynamic Field Response Prediction with Uncertainty Quantification *Joseph Osborn - WSU* *Harok Bae - WSU* *Carlos Suarez - AFRL* *José A. Camberos - AFIT*	*51DCASS-149* Differentiating Lithium-6 and Lithium-7 Isotope Contents Using Seven Spectral Lines from Laser Induced Breakdown Spectroscopy *Roscoe Schumann - GISA* *Anil Patnaik - AFIT* *Travis Morris - AFIT*	*51DCASS-143* Literature Review of Thrust Measurement Techniques for Pulse Jet Engines *Carlos Mcdonald - UC* *Ephriam Gutmark - UC*	*51DCASS-124* Evaluating and Validating Auto-generated Knowledge Graph Accuracy *Isaiah Goble - SBHS* *Kara Combs - AFRL*	*51DCASS-079* An Investigation into the Performance of a Conformal Heat Exchanger Compared to a Traditional Design *Nathan Lewan - WSU* *Mitch Wolff - WSU*
3:20 PM	Break							

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51st Dayton-Cincinnati Aerospace Sciences Symposium

Time	Room 116	Room 119	Room 120	Room 127	Room 133	Room 171	Room 262	Room 282
	SESSION 25 **Computational Fluid Dynamics 2** Chair: Jose Camberos *AFIT*	SESSION 26 **Flow Control & Analysis** Chair: Katherine Opacich *NRC*	SESSION 27 **Combustion Stability & Thermoacoustics** Chair: Achyut Panchal *UC*	SESSION 28 **Propulsion Systems & Diagnostics** Chair: James Rutledge *AFIT*	SESSION 29 **Additively Manufactured Structures** Chair: Arun Nair *AFIT*	SESSION 30 **Aerospace Education** Chair: Colin Engebretsen *AFIT*	SESSION 31 **Spaceflight Dynamics** Chair: Rachel Derbis *AFIT*	SESSION 32 **Flight Dynamics & Control Systems** Chair: Markus Rumpfkeil *UD*
3:40 PM	*51DCASS-006* DES of a Mach-6 Cavity with a Forward-Facing Door *Nicholas Bisek - AFRL* *Elizabeth K. Benitez - AFRL*	*51DCASS-002* Numerical Simulation of Pulsed Blowing Coanda-Jet Flow Control for a Wing Section *Donald Rizzetta - AFRL* *Daniel Garmann - AFRL*	*51DCASS-059* Analysis of End Plate Effect on Thermoacoustic instability using Symbolic recurrence *Tharun Srinivas Karnam Reddy - UC* *Ephraim J. Gutmark - UC* *Shyam Muralidharan - UC* *Yuvi Nanda - UC*	*51DCASS-026* Dynamic Controls of the 3-Dimensions Helmholtz Cage using PIDA Controls *Long Pham - UC* *John Radey - UC* *Jack Oakenful - CMU* *Ma Ou - UC* *Andrew Barth - UC*	*51DCASS-045* Assessing Damping Effectiveness with an Additively Manufactured Internal Powder Pocket Design *Madelyn Pratt - AFRL* *Dino Celli - AFRL* *Tommy George - AFRL* *John Brewer - AFIT*	*51DCASS-057* Building the Regional Aerospace Workforce by Building Advance Testing Platforms - The Planar Version *Gerardo Martinez-avila - UC* *Conrad Kent - UC* *Linus Dombrosky - UC*	*51DCASS-041* Aerodynamic Modeling of a VLEO Satellite *Tristan Martin - UKY* *Savio Poovathingal - UKY*	*51DCASS-022* Design and Planned Flight Evaluation of an Active Fin Airbraking System *Mubasshir Khan - UKY* *Savio Poovathingal - UKY*
4:00 PM	*51DCASS-109* Aeroelastic optimization benchmark investigations using ESP, FUN3D, TACS, and FUNtoFEM *Neal Novotny - AFRL* *David Sandler - UDRI*	*51DCASS-065* Airfoil gust mitigation using jet spoiler actuation *Spencer Stahl - AFRL* *Caleb J. Barnes - AFRL*	*51DCASS-074* Insights into Transition to Distributed Combustion: Acoustics, Flow and Flame *Shyam Muralidharan - UC* *Tharun Reddy - UC* *Yuvi Nanda - UC* *Ephraim Gutmark - UC*	*51DCASS-119* Analysis of Acoustic Modes in a Flow-Through Rotating Detonation Engine *Bret Lane - UC* *Ephraim Gutmark - UC*	*51DCASS-113* Characterizing the Combined Axial-Torsion Response of Additively Manufactured Polymers in Varied Print Orientations *Stephen Richter - AC* *John Brewer - AFIT*	*51DCASS-130* Aerospace Propulsion Outreach Program (APOP) Summary and 2024/2025 Competition Review *Samson Griffin - AFRL* *Kaitlyn Brendlinger - AFRL*	*51DCASS-053* Impact of Very Low Earth Orbit (VLEO) Environment on Multi-Surface Satellite Drag *Aleksei Shaverin - UKY* *Ahilan Appar - UKY* *Savio J Poovathingal - UKY*	*51DCASS-023* Building quantum into aerospace: virtual flight control surfaces from fusion-inspired superconductivity *John Bulmer - AFRL* *Brice Hall, Kadyn Tackett, Jake Blue, Blue, Sabrina Eddy, Mary-Ann Sebastian - AFRL* *Charlie Ebbing, Chris Kovacs, Tim Tim Haugan - AFRL*
4:20 PM	*51DCASS-153* Study of Helmholtz-Decomposed Navier-Stokes Equations for Unsteady Boundary Conditions *Bal Adhikari - UC* *Kaurab Gautam - UC* *Nabin Khanal - UC* *Shaaban Abdallah - UC*	*51DCASS-110* Analysis and Control of Bell-Shaped Lift Distributions at Off-design Conditions *Charles Cain - UD* *Sidaard Gunasekaran - UD*	*51DCASS-090* Multiscale oscillation dynamics of unstable flames in a Triple Annular Research Swirler (TARS) *Yuvi Nanda - UC* *Shyam Muralidharan - UC* *Tharun Reddy - UC* *Ephraim Gutmark - UC*	*51DCASS-082* Experimental validation of a thermodynamic cycle model for a micro-class turbojet engine *Noah Segerstrom - CU* *Dustin Luna - CU* *Joseph D. Miller - CU* *Zhaohui (Geroge) Qin - CU*	*51DCASS-118* Additively Manufactured Conformal Triply Periodic Minimal Surface Heat Exchanger Design and Evaluation *Tanner Barber - AFIT* *John Brewer - AFIT*		*51DCASS-096* Mapping Quasi-Chaotic Lunar Transport Pathways in the Earth-Moon CR3BP *Jeremiah Specht - AFIT* *Robert Bettinger - AFIT* *Rachel Oliver - AFIT* *Bruce Cox - AFIT*	*51DCASS-046* Safe Navigation in the Presence of Range-Limited Pursuers *Thomas Chapman - AFRL* *Alexander Von Moll - AFRL* *Isaac E. Weintraub - AFRL*
4:40 PM	*51DCASS-155* Quantum Hydrogen: H2 Probability Density and the Incompressible Navier-Stokes Solutions *Shaaban Abdhallah - UC* *Ethan Leszczynski - UC*	*51DCASS-127* Experimental Investigation of Dynamic Pitching Effects on a Delta Wing with Blown Jet *Julian Pabon - UD* *Sidaard Gunasekaran - UD*	*51DCASS-102* Hydrogen Combustor Flame Stability Characterization Amid Thermoacoustic and Hydrodynamic Disturbances Using Nonlinear Analysis Methods *Michael Larson - UC* *Ephraim Gutmark - UC*	*51DCASS-013* Development of an Altitude Conditioning System for Dual Cylinder Two-Stroke Engines *Thomas Balaj - AFIT* *Joseph K. Ausserer and Marc D. Polanka - AFIT* *Jacob A. Baranski and Adam C. Brown - ISSI*	*51DCASS-148* Integrating Lightweight Structures and FEA for Validating Novel Composite Materials & Architectures *Tahseen Al-wattar - CSU* *Mohammadreza Hadizadeh - CSU*		*51DCASS-106* Non-Planar Multipass Aerobraking Around the Earth and Mars *Colin Pate - AFIT* *Robert Bettinger - AFIT* *Kerry Hicks - AFIT*	*51DCASS-077* Model-Based Design and Validation of Closed-Loop Aerodynamic Control for High-Powered Model Rockets Using a Python Digital Flight Environment *Sebastian Toledo - CU* *Sebastian Mackliff Davalos - CU* *Joseph D. Miller - CU*
5:00 PM			*51DCASS-154* Acoustic Impedance Matching in Rotating Detonation Engines with Helmholtz Resonator Fluidic Injector Model *Grayson Razavi - UC* *Ephraim Gutmark - UC*		*51DCASS-150* Pressure limitations based on wall thickness of a TPMS lattice structure *Kathleen Spangler - AFIT* *John Brewer - AFIT* *Tanner Barber - AFIT* *Zachary Garner - AFRL* *Abdeel Roman - AFRL*		*51DCASS-151* Retrospective 3-Degree-Of-Freedom Performance Evaluation of Boeing X-20 Dyna-Soar *Jinhee Byun - AFIT* *Robert Bettinger - AFIT* *Kerry Hicks - AFIT*	*51DCASS-152* Light-Curve Simulation Datasets for Rocket-Body Characterization *Elijah Lewis - CU* *Doxa Kudari - CU* *George Landon - CU*
5:20 PM	Adjourn							

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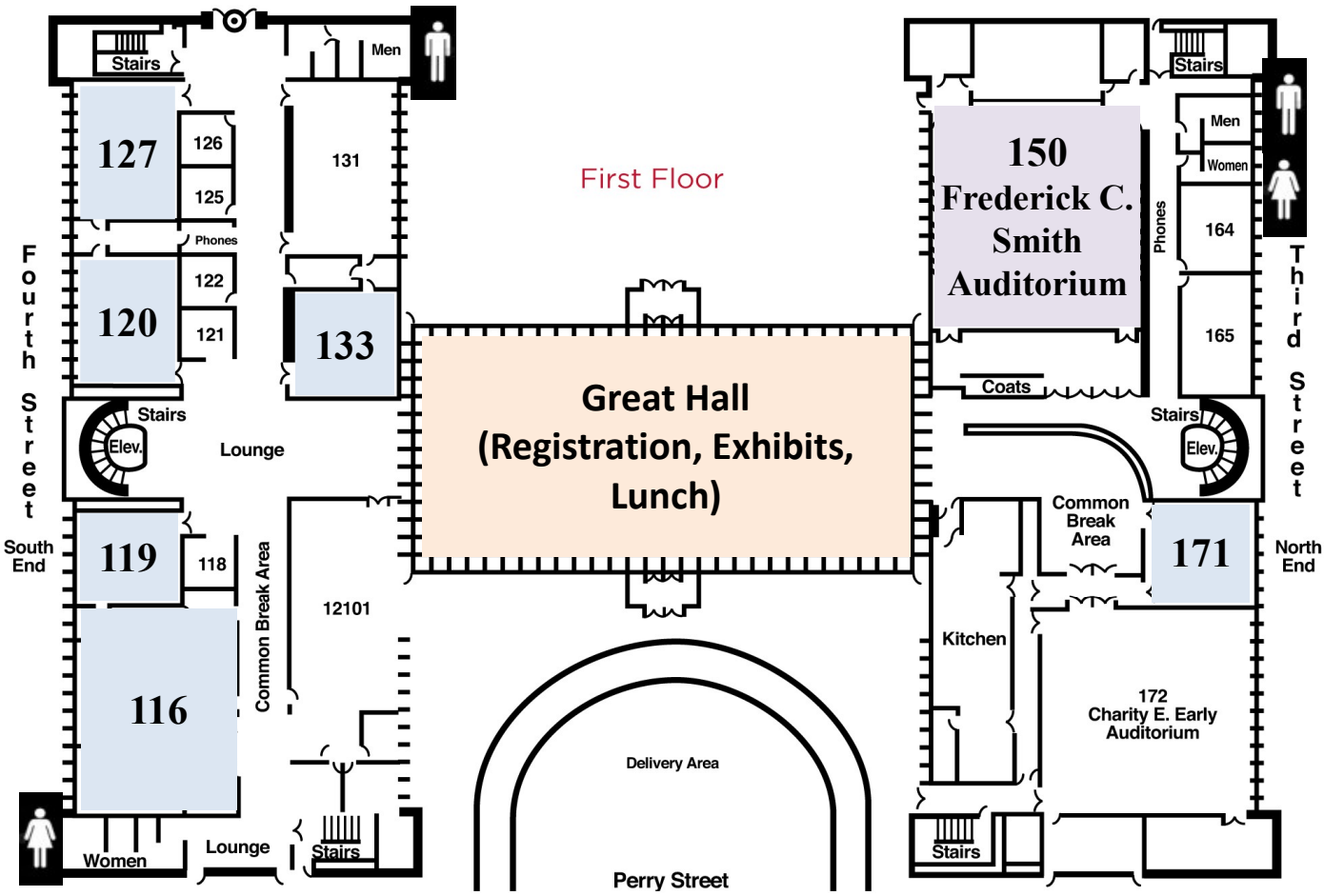
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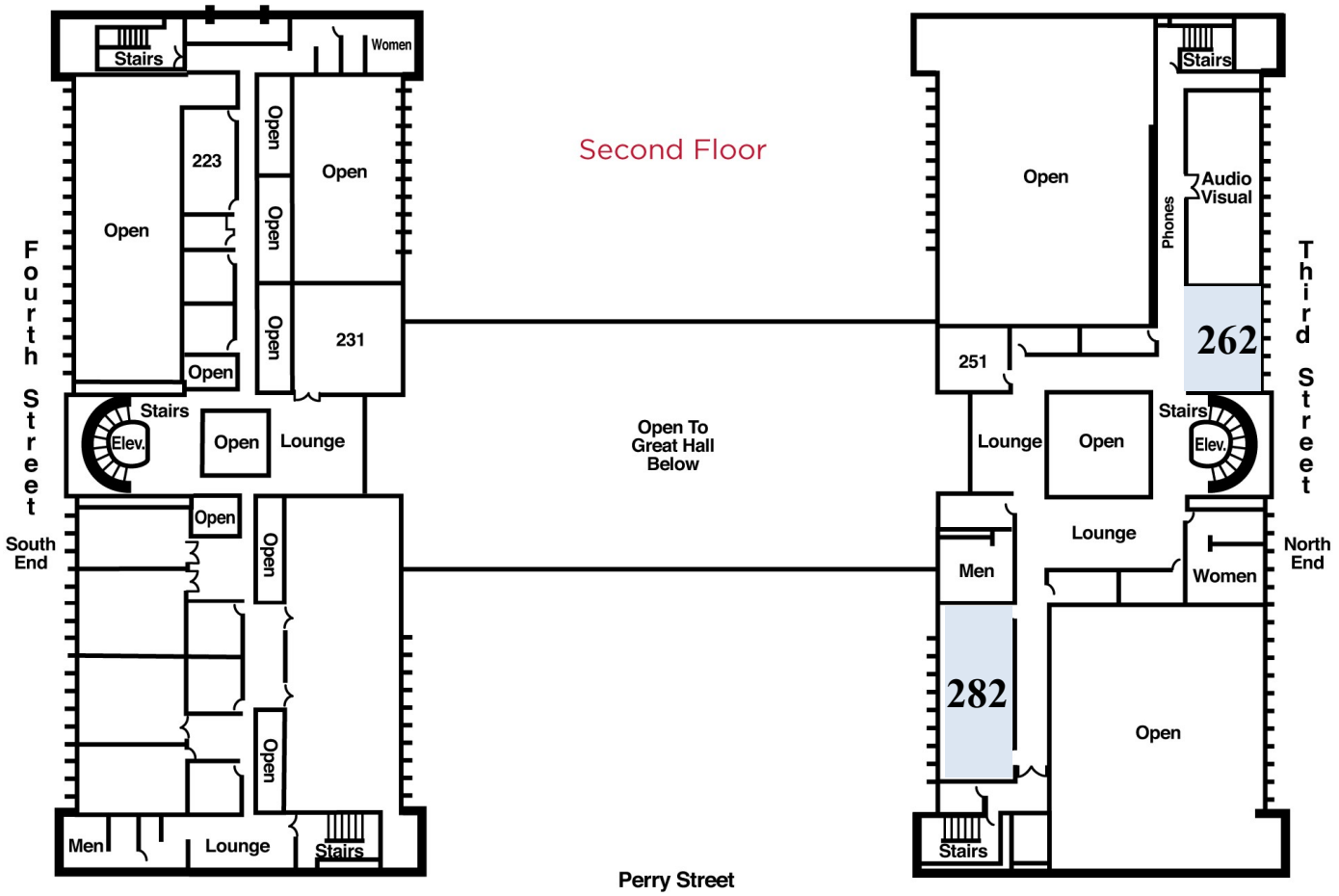
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