AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS
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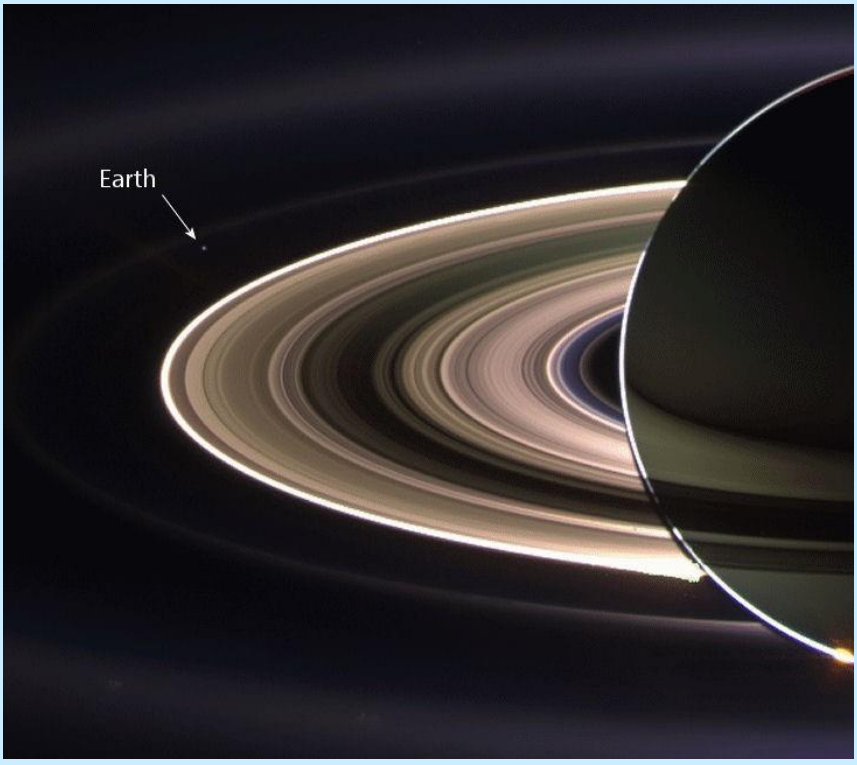
SYMPOSIUM GUIDE

The Forty-Third Annual

Dayton-Cincinnati Aerospace Sciences Symposium



CASSINI IMAGE: SATURN IN BACKLIGHT, WITH THE EARTH IN THE SHOT
Image Courtesy NASA/JPL-Caltech

27 February 2018
Sinclair Conference Center
Dayton, Ohio

www.aiaa-daycin.org/dcass

Ohio Valley Section

Human Factors and Ergonomics Society

Society for the Advancement of Material and Process

Welcome

to the
43rd AIAA Dayton-Cincinnati Aerospace Sciences Symposium (DCASS)

- - - - -

For over four decades, the AIAA Dayton-Cincinnati Aerospace Sciences Symposium has provided a unique venue for technical interchange with members of our regional aerospace community. The symposium showcases cutting-edge research with a one-day program that includes technical presentations across multiple areas of aerospace science and technology.

This year's program includes over 130 technical presentations in both morning and afternoon sessions. Our invited keynote speaker is Mr. Todd J. Barber, *JPL Senior Propulsion Engineer*. Mr. Barber is wrapping up two decades as the lead propulsion engineer on the Cassini mission to Saturn, and he will be discussing that mission during the keynote address.

This event 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 sustained effort. We thank the local leaders supporting DCASS as general co-chairs, 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 folks to submit their votes for best art-in-science submissions. The best presentation and best art-in-science award winners will be recognized at the annual Dayton-Cincinnati Section Awards Banquet tentatively scheduled for May 24, 2017.

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

Carl Hartsfield and Andrew Caswell
2018 DCASS Executive Co-Chairs

43rd AIAA Dayton-Cincinnati Aerospace Sciences Symposium

Keynote Program

Welcome and Announcements:

Dr. Carl Hartsfield

2018 DCASS Executive Chair

Keynote Address:

Lord of the Rings: The Cassini Mission to Saturn

Mr. Todd J. Barber

JPL Senior Propulsion Engineer

Todd Barber is a JPL senior propulsion engineer, wrapping up two decades as lead propulsion engineer on the Cassini mission to Saturn following part-time work on the Mars Exploration Rover (MER) mission, Deep Impact mission, and the Mars Science Laboratory (MSL) mission, which landed the large rover Curiosity on the red planet on August 5th, 2012. Cassini was launched on October 15, 1997 on its two billion mile, seven year journey to the ringed planet. It recently "took the plunge" into Saturn's atmosphere after thirteen years in orbit around Saturn. The MER team launched twin rovers to the red planet in June and July of 2003, and Opportunity is still going strong nearly fourteen years after landing. Todd also worked as the lead impactor propulsion engineer on Deep Impact, which successfully crashed into Comet Tempel-1 on Independence Day, 2005, at twenty-three-thousand miles per hour. Todd continues working on the Dawn mission, an ion propulsion mission to the two largest main-belt asteroids, Vesta and Ceres. He also recently began supporting the Soil Moisture Active Passive (SMAP) mission. Much to Todd's delight, he is now supporting the Voyager mission as well, more than forty years after launch.

Mr. Barber worked on the Galileo project for over seven years and his primary responsibility was getting Galileo into Jupiter orbit on December 7, 1995. Todd also worked part-time on the Space Infra-Red Telescope Facility (SIRTF) mission and on the Stardust mission, as well as the Mars Sample Return mission and a Mars airplane study. Todd received NASA's Exceptional Achievement Award in 1996 for his work on Galileo. He also worked three years on the Deep Space One mission, the first NASA mission to use electric propulsion (a la "Star Trek"). This mission included flybys of a near-Earth asteroid, Braille, and a comet named Borrelly.

Mr. Barber is a native of Wichita, Kansas, and attended MIT between 1984 and 1990, obtaining B.S. and M.S. degrees in aerospace engineering, with a humanities concentration in music. He is also a composer of church choral music, with two pieces published to date. His hobbies include singing charitably and professionally, playing the piano, snagging degree confluences (exact integer latitude/longitude intersections), visiting all the U.S. tri-state corners and national parks, playing basketball (though it's been a while), and amateur astronomy.

AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS

AIAA Dayton-Cincinnati Section

DAYTON-CINCINNATI SECTION

2018 DAYTON-CINCINNATI SECTION AWARDS

CALL FOR NOMINATIONS

Recognize the achievements of your colleagues. The local Awards Banquet, to be held on May 24, 2018 (tentative date) at the Kennedy Union Ballroom, University Of Dayton, is fast approaching. 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 27 April 2018 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:
Affiliation:
Address:
Tel:
E-mail:

Nominator:
Affiliation:
Address:
Tel:
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 – 4:55 PM

First Block 8:00 AM – 9:20 AM

1	Combustion I	Room 116
2	Heat Transfer and Thermal Management I	Room 119
3	CFD Applications and Methods I	Room 120
4	Fluid Dynamics I	Room 127
5	Unmanned Aerial Systems I	Room 131
6	Flight Dynamics and Control I	Room 133
7	Aircraft Design	Room 171
8	Design and Optimization I	Room 231
9	Space I	Room 282

Second Block 9:40 AM – 11:00 AM

10	Combustion II	Room 116
11	Heat Transfer and Thermal Management II	Room 119
12	CFD Applications and Methods II	Room 120
13	Fluid Dynamics II	Room 127
14	Unmanned Aerial Systems II	Room 131
15	Flight Dynamics and Control II	Room 133
16	Structures	Room 171
17	Design and Optimization II	Room 231
18	Space II	Room 282

Keynote Program in Frederick C. Smith Auditorium (Room 150) 11:10 AM – 12:20 PM

Lunch in Great Hall 12:20 PM – 1:30 PM

Third Block 1:30 PM – 2:50 PM

19	Combustion III	Room 116
20	Heat Transfer and Thermal Management III	Room 119
21	CFD Applications and Methods III	Room 120
22	Fluid Dynamics III	Room 127
23	Unmanned Aerial Systems III	Room 131
24	Imaging, Diagnostics, and Sensors	Room 133
25	Materials, Fatigue, and Fracture I	Room 171
26	Design and Optimization III	Room 231
27	Space III	Room 282

Fourth Block 3:00 PM – 4:20 PM

28	Combustion IV	Room 116
29	Turbomachinery	Room 119
30	Hypersonic Flight	Room 120
31	Flow Control and Acoustics	Room 127
32	Unmanned Aerial Systems IV	Room 131
33	Experimental Applications and Methods	Room 133
34	Materials, Fatigue, and Fracture II	Room 171
35	Uncertainty Quantification	Room 231
36	Space IV	Room 282

The abstracts for the talks presented today may be found on the AIAA Dayton-Cincinnati Section website: www.aiaa-daycin.org/dcass . The Executive Committee encourages the use of this website. The abstracts can be located under the "Attending" menu at the top of the Aerospace Sciences Symposium 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
Combustion Science	1, 10, 19, 28	Aircraft Design, Dynamics, and Control	6, 7, 15, 31
Heat Transfer and Thermal Management	2, 11, 20, 29	Materials and Structures	16, 25, 34
Computational Studies and Methods	3, 12, 21	Design and Optimization	8, 17, 26, 35
Fluid Dynamics	4, 13, 22	Space Science	9, 18, 27, 36
Unmanned Aerial Systems	5, 14, 23, 32	Experimental Methods	24, 30, 33

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!

AIAA Dayton-Cincinnati Section

Room	116	119	120	127	131
	SESSION 1 **Combustion I** Chair: Brent Rankin *AFRL*	SESSION 2 **Heat Transfer and Thermal Management I** Chair: James Rutledge *AFIT*	SESSION 3 **CFD Applications and Methods I** Chair: Michael List *AFRL*	SESSION 4 **Fluid Dynamics I** Chair: Sid Gunasekaran *UD*	SESSION 5 **Unmanned Aerial Systems I** Chair: Harok Bae *WSU*
Time					
8:00 AM	*43DCASS-052* Characterization of a Toroidal Jet-Stirred Reactor using Hot-Wire Anemometry and Tunable Diode Laser Absorption Spectroscopy (TDLAS) *Robert Stachler - UD* *Joshua Heyne, PhD - UD* *Scott Stouffer, PhD - UDRI* *Joseph Miller, PhD - AFRL* *Keith Rein, PhD - SE*	*43DCASS-040* Use of Carbon Nanotube sheet material as Thin Film Heaters *Christopher Rocker - AFIT*	*43DCASS-002* An Overset-Mesh Approach for Wall-Modeled LES of High-Reynolds Number Airfoil Flows *Donald Rizzetta - AFRL* *Daniel Garmann - AFRL* *Miguel Visbal - AFRL*	*43DCASS-067* Impact of Rotor Wake Structures on Aerodynamic Performance over a Range of Low-Reynolds Number Conditions *Mark Sutkowy - OSU* *Anshuman Pandey - OSU* *Matthew H. McCrink - OSU* *James W. Gregory - OSU*	*43DCASS-022* Automatic Generation of No-Fly Zones from Area Characteristics for Autonomous UAV Operations *Matthew Verbryke - UC* *Dr. Catharine McGhan - UC*
8:20 AM	*43DCASS-066* Combustor Rig Sensitivity to Derived Cetane Number for Lean Blowout and Ignition Results from Year Three of the National Jet Fuels Combustion Program *Erin Peiffer - UD* *Joshua Heyne, Ph.D. - UD*	*43DCASS-075* Thermal Management of Satellite Electronics via Gallium as a Phase Change Material *Brian Palmer - AFIT*	*43DCASS-004* The Effects of Damping Uncertainty on Flutter Prediction with CFD *Luke Welch - AFRL* *Philip Beran - AFRL*	*43DCASS-088* Fluidic Oscillators Injecting into Backward-Facing Steps *Brian Bohan - AFIT* *Marc Polanka - AFIT*	*43DCASS-013* Operational Factors in Autonomous Vehicle Task Selection *Christopher Olsen - AFIT* *Dr. Donald L. Kunz - AFIT*
8:40 AM	*43DCASS-114* Lean Blowout of a Swirl-Stabilized Single-Cup Combustor Under Low Temperature Conditions *Jennifer Colborn - UD* *Tyler Hendershott - UDRI* *Scott Stouffer - UDRI* *Edwin Corporan - AFRL* *Andrew W. Caswell - AFRL*	*43DCASS-084* Experiment Techniques for Heat Transfer Analysis on a High Temperature Nose Cone *Kan Liu - AFIT* *Dr. Carl Hartsfield - AFIT*	*43DCASS-016* Wall Modeled Large Eddy Simulation of a Swept Compression Ramp *Nicholas Marco - AFIT* *Jeffrey Komives - AFIT*	*43DCASS-041* Investigation of Near Wake Turbulent Fluctuations and its Relation to Wing Performance *Steven Goodman - UD* *Dr. Sidaard Gunasekaran - UD*	*43DCASS-049* Autonomous Waypoint Navigation System for Quadrotors Using UxAS and a ROS-based Autopilot *Jishu Medhi - UC* *Dr. Catharine McGhan - UC*
9:00 AM	*43DCASS-097* Parameter Impact on Heat Flux in a Rotating Detonation Engine *Samuel Meyer - AFIT* *Marc Polanka - AFIT* *Frederick Schauer - AFRL* *John Hoke - ISSI*	*43DCASS-005* Impact welding for rapid repair of heat-treated components *Bert Liu - AFIT* *Bert Liu - AFIT* *Anthony Palazotto - AFIT* *Anupam Vivek - Other* *Glenn Daehn - Other*	*43DCASS-035* Multi-fidelity Analysis of Generic Unmanned Systems *Montreal Johnson - AFRL*		*43DCASS-024* Facilitating UAS Log Data Analysis Using Open Source Tools *Ryan Engle - AFIT* *Brent T. Langhals - AFIT* *Michael R. Grimaila - AFIT* *Douglas D. Hodson - AFIT*
9:20 AM	Break				

Affiliation Abbreviations

AFIT = Air Force Institute of Technology
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ANL = Argonne National Laboratory
DAT = D Angelo Technologies, LLC
GHI = GoHypersonic Inc.
ISSI = Innovative Scientific Solutions Inc.
MU = Miami University
NRC = National Research Council
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OSU = The Ohio State University

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43rd Dayton-Cincinnati Aerospace Sciences Symposium

133	171	231	282	Room
SESSION 6 **Flight Dynamics and Control I** Chair: Rick Wills *ABDA*	SESSION 7 **Aircraft Design** Chair: Joseph D Angelo *DAT*	SESSION 8 **Design and Optimization I** Chair: James B Cole *AFIT*	SESSION 9 **Space I** Chair: Kirk Johnson *AFIT*	Time
43DCASS-014 Analytical Determination of a Helicopter Height Velocity Diagram *Justin Harris - AFIT* *Donald Kunz - AFIT* *Joshuah Hess - AFIT*	*43DCASS-110* Progress of Lighter than Air Vehicles Considering an Internal Vacuum *Ruben Adorno - AFIT* *Dr. Anthony Palazotto - AFIT*	*43DCASS-009* Multi-Fidelity Surrogate Models for Flutter Analysis *Markus Rumpfkeil - UD*	*43DCASS-001* Utilizing High Performance Computing to Study Risks of Emergent Large-Scale Debris Fields in Low Earth Orbit. *David Buehler - AFIT*	8:00 AM
43DCASS-106 Linear Modeling of an Electromechanical Actuator Test Rig *Jeremiah Hoffman - AFIT* *Anthony N. Palazotto - AFIT* *Nicholas Niedbalski - AFRL*	*43DCASS-070* Distributed Lift is More Feasible Than Expected! *Aaron Altman - UD* *Andrew Truszkowski - UD*	*43DCASS-006* Developing and comparing evasion strategies in pursuer, evader and defender differential games *David Spendel - AFIT* *Capt Joshuah Hess - AFIT*	*43DCASS-008* Fused Deposition Modeling in an Orbital Environment *Joshua Cerri - AFIT* *Dr. Carl R. Hartsfield - AFIT* *John P. McCrea - AFIT*	8:20 AM
43DCASS-026 Adaptive Harmonic Control for Rejection of Sinusoidal Disturbances: Theory and Application to Aerospace Systems *Mohammadreza Kamaldar - UKY* *Jesse B. Hoagg - UKY*	*43DCASS-094* Static Nonlinear Analysis of a Celestial Icosahedron Shaped Vacuum Lighter Than Air Vehicle *Kyle Moore - AFIT* *Dr. Anthony Palazotto - AFIT*	*43DCASS-045* Robot Swarm inspired by Ant Colony for Augmented Search and Retrieval *Aditya Milind Deshpande - UC* *Dr. Manish Kumar - UC* *Dr. Subramanian Ramakrishnan - UMD*	*43DCASS-031* Consensus on SO(3) Using Piecewise-Continuous Sinusoidal Angular-Velocity Control with Application to Small-Satellite Swarms *Roshan Chavan - UKY* *Shaoqian Wang - UKY* *T. Michael Seigler - UKY* *Jesse B. Hoagg - UKY*	8:40 AM
	43DCASS-113 Model-Based System Design for Aerospace Conceptual Design *Brendan Rooney - AFRL*	*43DCASS-046* Self-Organized Circle Formation around an Unknown Target by a Multi-Robot Swarm using a Local Communication Strategy *Aditya Milind Deshpande - UC* *Dr. Manish Kumar - UC* *Dr. Ali Minai - UC*	*43DCASS-010* Characterization and Analysis of Anomalous Diffusion Modes in a 600 W Permanent Magnet Hall Thruster *Samuel Wright - AFIT*	9:00 AM
Break				9:20 AM

Affiliation Abbreviations

P&G = Procter & Gamble
PU = Purdue University
SE = Spectral Energies LLC
UBIMS = Univ. Bordeaux
UC = University of Cincinnati
UD = University of Dayton
UDRI = University of Dayton Research Institute
UKY = University of Kentucky
UMD = University of Minnesota Duluth
WSU = Wright State University
WVU = West Virginia University

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Room	116	119	120	127	131
Time	SESSION 10 **Combustion II** Chair: Michael Renfro *UKY*	SESSION 11 **Heat Transfer and Thermal Management II** Chair: John Clark *AFRL*	SESSION 12 **CFD Applications and Methods II** Chair: Markus Rumpfkeil *UD*	SESSION 13 **Fluid Dynamics II** Chair: Benjamin Halls *AFRL*	SESSION 14 **Unmanned Aerial Systems II** Chair: Stephen Cain *AFIT*
9:40 AM	*43DCASS-135* Oscillating versus Accelerative Manners of Flame Propagation in Obstructed Conduits with both Ends Open *Amanda Cathreno - WVU* *Elizabeth Ridgeway - WVU* *Abdulafeez Adebiyi - WVU* *V'yacheslav Akkerman - WVU*	*43DCASS-086* Investigation of Geometric and Thermal Scaling Effects on a Simulated Turbine Leading Edge Model *James Tewaheftewa - AFIT* *Marc Polanka - AFIT* *James L. Rutledge - AFIT* *Carol E. Bryant - AFIT*	*43DCASS-025* Analysis of Simulated Scramjet Unstart Dynamics using Model Order Reduction Methods *Logan Riley - OSU* *Mark Hagenmaier - AFRL* *Jeffrey Donbar - AFRL* *Datta Gaitonde - OSU*	*43DCASS-037* Atomization Physics of Pulsing Liquid Jet and Jet in Crossflow *Himakar Ganti - UC* *Dr. Prashant Khare - UC*	*43DCASS-028* Measurement of Unsteady Gusts in an Urban Wind Field using a UAV-based Anemometer *Ryan Thorpe - OSU* *Matthew H. McCrink - OSU* *James W. Gregory - OSU*
10:00 AM	*43DCASS-072* High-Speed Schlieren & Dynamics of a Centrifugally-Loaded, Backward-Facing Step Burner *Tim Erdmann - ISSI* *Dr. Andrew Caswell - AFRL* *Prof. Ephraim Gutmark - UC*	*43DCASS-133* The Kentucky Re-entry Universal Payload System (KRUPS): The Experimental Testbed *James Sparks - UKY* *Gabriel I. Myers - UKY* *Christen E. Setters - UKY* *Alexandre Martin - UKY* *Suzanne W. Smith - UKY*	*43DCASS-074* Lift and Drag Approximation of a Complex Hypersonic Vehicle using Cart3D and Small-Disturbance Theory in a Variable-Fidelity Kriging Framework *James Tancred - UD* *Markus Rumpfkeil - UD*	*43DCASS-053* Three-dimensional unsteadiness in the wake of bluff body flows *Matthew Aultman - OSU* *Datta Gaitonde - OSU*	*43DCASS-105* The Measurement of Turbulence with Unmanned Aerial Vehicles *Jonathan Hamilton - UKY* *Caleb Canter - UKY* *Sean C.C. Bailey - UKY*
10:20 AM	*43DCASS-104* Negative edge flame velocities in a turbulent flow *Stephen Grib - UKY* *Michael Renfro - UKY*	*43DCASS-091* Computational Analysis of an Additively Manufactured Cooled Ultra Compact Combustor Vane *Kevin DeMarco - AFIT* *Marc Polanka - AFIT* *Brian T. Bohan - AFIT* *James L. Rutledge - AFIT*	*43DCASS-080* High-Fidelity Simulations of the UTSI Mach 2 Test Section *Nicholas Bisek - AFRL*	*43DCASS-058* Characterizing Wave Propagation in a Blow-Down Type Unsteady Transonic Wind Tunnel *Wenbo Zhu - OSU* *James W. Gregory - OSU* *Jeffrey P. Bons - OSU*	*43DCASS-101* Measurement of Atmospheric Surface Layer Turbulence Using Unmanned Aerial Vehicles During Total Solar Eclipse *Caleb Canter - UKY* *Dr. Sean Bailey - UKY*
10:40 AM	*43DCASS-143* A New Experimental Test Bed for Cavity-Stabilized Reacting Flows *Brendan Paxton - ISSI* *Kyle Brady - NRC* *Christopher Fugger - SE* *Ethan Legge - SE* *Andrew Caswell - AFRL*	*43DCASS-111* Scaling Low Temperature Adiabatic Effectiveness Results Using Various Flow Rate Parameters *Jacob Fischer - AFIT* *James Rutledge - AFIT* *Marc Polanka - AFIT*	*43DCASS-129* On Shock boundary layer interactions and Multiphysics modeling of rectangular supersonic nozzles *Kalyani Bhide - UC* *Kiran Siddappaji - UC* *Dr. Shaaban Abdallah - UC*	*43DCASS-017* An Efficient Euler Method to Predict the Migration of Shocks on a Cropped Delta Wing *Dylan Hope - AFIT*	*43DCASS-130* Three-Dimensional Terrain Reconstruction using UAV Imagery and GPS RTK Systems *Rumit Kumar - UC* *Chandrasekar Venkatesh - UC* *Bryan Brown - UC* *Paul Hans Guentert - UC* *Dr. Mehdi Norouzi - UC* *Dr. Manish Kumar - UC* *Dr. Victor Hunt - UC* *Dr. Kelly Cohen - UC* *Dr. Arthur J Helmicki - UC* *Fred Judson - ODOT*
11:00 AM	Break				
11:10 AM	Room 150 - Frederick Smith Auditorium Welcome & Announcements Dr. Carl Hartsfield, *43rd DCASS General Chair*				
12:20 PM	Networking Lunch				

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133	171	231	282	Room
SESSION 15 **Flight Dynamics and Control II** Chair: Zhenyu Wang *OSU*	SESSION 16 **Structures** Chair: Anthony Palazotto *AFIT*	SESSION 17 **Design and Optimization II** Chair: Jose Camberos *AFRL*	SESSION 18 **Space II** Chair: Joshuah Hess *AFIT*	Time
43DCASS-048 Effects of System Time Delay as Humans Learn to Control Aerospace Systems *Seyyedalireza Seyyedmousavi - UKY* *T. M. Seigler - UKY* *Jesse B. Hoagg - UKY*	*43DCASS-092* Hexakis Icosahedron Vacuum Lighter than Air Vehicle Structural Analysis of the Air Evacuation System *Anthony Castello - AFIT* *Dr. Anthony Palazotto - AFIT*	*43DCASS-061* Target Tracking using Neural Networks and Genetic Algorithms *Seth Holsinger - UC* *Dr. Rajnikant Sharma - UC*	*43DCASS-007* Design of a Zero-Gravity, Vacuum-Based 3D Printer Robot for use of In-Space Satellite Assembly *John McCrea - AFIT* *Dr. Carl Hartsfield - AFIT* *Capt Joshua Cerri - AFIT*	9:40 AM
43DCASS-064 Fuzzy logic based variable damping and variable stiffness admittance control for multi-UAV collaborative transportation *Shraddha Barawkar - UC*	*43DCASS-103* Multi-Material Projectile Impact Against Concrete Targets *Aadit Patel - AFIT* *Dr. Anthony Palazotto - AFIT*	*43DCASS-050* Disturbance Rejection in Swarm Formation Using Laguerre Function and Ritz Method *Mohammadreza Radmanesh - UC* *Manish Kumar - UC* *Kelly Cohen - UC* *Donald French - UC*	*43DCASS-015* Space Based Maneuver Detection and Characterization using Multiple Model Adaptive Estimation *Justin Katzovitz - AFIT* *Capt Joshuah Hess, PhD - AFIT*	10:00 AM
43DCASS-073 Design, Modeling and Control of a Solar-Powered Quadcopter *Nathaniel Kingry - OSU* *Ran Dai - OSU*	*43DCASS-115* CubeSat Deployable Solar Panel Hinge Using Nitinol Smart Memory Alloy *Rodrigo Ocampo - AFIT*	*43DCASS-030* Visual Position Estimation based on Optical Flow using Neural Network *Hongyun (Elliot) Lee - OSU* *Matthew McCrink - OSU* *James Gregory - OSU*	*43DCASS-076* Satellite Articulation Tracking Using Monocular Computer Vision *David Curtis - AFIT* *Richard Cobb - AFIT*	10:20 AM
43DCASS-146 Computational Aerodynamic and Acoustic Performance of Small-scale Multicopter Rotors at Low Reynolds Numbers *Quinten Henricks - OSU* *Zhenyu Wang - OSU* *Mei Zhuang - OSU*	*43DCASS-083* Bearing Strength Optimization and Characterization of a Hybrid Composite Structure *John Brewer - AFIT* *Dr. Anthony N. Palazotto - AFIT* *Michael Falugi - AFRL*	*43DCASS-123* The Unreasonable Effectiveness of Mathematics and Modeling, What Smart Models Can Do for You: Applications to Computation and Machine Learning *James B Cole - AFIT*	*43DCASS-102* Fuel-Optimal Trajectory Generation for Spacecraft Rendezvous and Docking with Mission Constraints *Changhuang Wan - OSU* *Ran Dai - OSU* *Ping Lu - Other*	10:40 AM
Break				11:00 AM
Room 150 - Frederick Smith Auditorium Keynote Address **Lord of the Rings: The Cassini Mission to Saturn** Mr. Todd J. Barber, *JPL Senior Propulsion Engineer at NASA*				11:10 AM
Networking Lunch				12:20 PM

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	SESSION 19 **Combustion III** Chair: Robert Hancock *AFRL*	SESSION 20 **Heat Transfer and Thermal Management III** Chair: James Rutledge *AFIT*	SESSION 21 **CFD Applications and Methods III** Chair: Nicholas Bisek *AFRL*	SESSION 22 **Fluid Dynamics III** Chair: Aaron Altman *UD*	SESSION 23 **Unmanned Aerial Systems III** Chair: Ran Dai *OSU*
Time					
1:30 PM	*43DCASS-122* Towards Modelling of Oxy-Fuel Premixed Combustion in a Supercritical CO2-diluted Environment *Abdulafeez Adebiyi - WVU* *V'yacheslav Akkerman - WVU* *Konstantin A. Kemenov - Other*	*43DCASS-098* Investigating the Nonlinear Melt Region Produced Within a High Speed Environment *Armando DeLeon - AFIT* *Dr. Anthony Palazotto - AFIT* *Dr. William Baker - AFIT*	*43DCASS-079* Numerical Simulation of In-Hole and Surface Roughness and Resulting Film Cooling Effectiveness *Melvin Ikwubuo - MU* *Dr. David Munday - MU* *Dr. Edgar Caraballo - MU* *Dr.Ryan Clark - MU*	*43DCASS-099* Employing Buckingham Pi and Regression Analysis to Guide Simplified Prediction of Aerial Ground Drop Patterns. *Saad Qureshi - UD* *Aaron Altman - UD*	*43DCASS-068* Unmanned Aerial Vehicle Path Planning via a Decomposition Algorithm for Quadratically Constrained Quadratic Programs *Sixiong You - OSU* *Ran Dai - OSU*
1:50 PM	*43DCASS-062* Spray and combustion of kerosene in air crossflow *Manu Kamin - UC* *Prashant Khare - UC*	*43DCASS-118* Computational Study of the HYMETS Arc Jet Flow using KATS *Umran Duzel - UKY* *Olivia Schroeder - UKY* *Alexandre Martin - UKY*	*43DCASS-108* Direct Simulation of Two-Phase Flow in Porous Media using Volume-Of-Fluid (VOF) Method to Investigate Capillary Pressure-Saturation Relationship *Santosh Konangi - UC* *Nikhil K Palakurthi - UC* *Nikolaos Karadimitriou - Other* *Ken Comer - P&G* *Urmila Ghia - UC*	*43DCASS-100* The Relationship Between Liquid Jet Breakup and Aerial Fire Suppressant Ground Drop Patterns. *Saad Qureshi - UD* *Aaron Altman - UD*	*43DCASS-093* Optimal Path Planning for SUAS Target Observation through Constrained Urban Environments using Simplex Methods *Michael Zollars - AFIT* *Richard G. Cobb - AFIT* *David J. Grymin - AFIT*
2:10 PM	*43DCASS-077* Grid Independence in Large Eddy Simulations of a Premixed Bluff-Body Flame *Joshua Sykes - ISSI* *Christopher Fugger - SE* *Andrew Caswell - AFRL* *Brent Rankin - AFRL*	*43DCASS-119* Implicit Flux Balancing in a Finite Volume Material Response Solver *Olivia Schroeder - UKY* *Justin Cooper - UKY* *Olivia Schroeder - UKY* *Haoyue Weng - UKY* *Alexandre Martin - UKY*	*43DCASS-125* Use of Machine Learning and GPU computing to study Lattice Boltzmann Methods for fluid flow simulations *Raghuvir reddy Jonnagiri - UC* *Prof. Ephraim Gutmark - UC*	*43DCASS-095* Suppression of Vortex-Induced Vibrations for Elliptic Cross Sections Through Thermal Effects *Jeffrey DesRoches - AFIT* *Dr. Anthony Palazotto - AFIT* *Dr. Hui Wan - AFRL* *Dr. Soumya Patnaik - AFRL*	*43DCASS-054* Autonomous Path Following of a Fixed Wing small-UAV *Srijanee Biswas - UC* *Chase Hartman - UC*
2:30 PM		*43DCASS-120* CFD Modeling for KRUPS's KOREVET Launch *Christen Setters - UKY* *Devin Sparks - UKY* *Olivia Schroeder - UKY* *Justin Cooper - UKY* *Alexandre Martin - UKY*		*43DCASS-090* Effect of Segmented Trailing Edge Extensions on Aerodynamic Efficiency *Daniel Curry - UD* *Sidaard Gunasekaran - UD*	*43DCASS-044* Localization and Routing in GPS-Denied Environment *Sohum Misra - UC* *Rajnikant Sharma - UC*
2:50 PM	Break				

Affiliation Abbreviations

AFIT = Air Force Institute of Technology
AFRL = Air Force Research Laboratory
ANL = Argonne National Laboratory
DAT = D Angelo Technologies, LLC
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MU = Miami University
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43rd Dayton-Cincinnati Aerospace Sciences Symposium

133	171	231	282	Room
SESSION 24 **Imaging, Diagnostics, and Sensors** Chair: Levi Thomas *AFIT*	SESSION 25 **Materials, Fatigue, and Fracture I** Chair: Robert Lowe *UD*	SESSION 26 **Design and Optimization III** Chair: Hafez Tari *UD*	SESSION 27 **Space III** Chair: Joshuah Hess *AFIT*	Time
43DCASS-029 Statistical photo-calibration of photo-detectors for radiometry without calibrated light sources *Stephen Cain - AFIT* *Nicholas Yielding - AFRL*	*43DCASS-036* Effect of Forging Variables on the Occurrence of Abnormal Grain Growth during Beta Annealing of Ti-6Al-4V *Lee Morris - AFIT* *Maj. Ryan O'Hara - AFIT* *Dr. S. L. Semiatin - AFRL*	*43DCASS-055* Analysis and Optimization of Ducted Wind Turbines *Tariq Khamlaj - UD* *Markus P. Rumpfkeil - UD*	*43DCASS-011* Linear Hall Effect Thruster Characterization Through Potential, Magnetic, and Optical Measurements *Braeden Sheets - AFIT*	1:30 PM
43DCASS-142 X-ray scattering measurements for multiphase flows *Benjamin Halls - AFRL* *Naveed Rahman - PU* *Terrence R. Meyer - PU* *James R. Gord - AFRL* *Alan L. Kastengren - ANL*	*43DCASS-082* The Process of using Langmuir-Blodgett Technique to produce Highly Aligned Monolayer Films of Single-Walled Carbon Nanotubes *Ali Al Mafarage - WSU* *Dr. Maher Amir - WSU*	*43DCASS-065* Memristive Device based Bio-inspired Learning for Robots *Mohammad Sarim - UC* *Dr. Manish Kumar - UC* *Dr. Rashmi Jha - UC* *Dr. Ali A Minai - UC*	*43DCASS-069* Utilizing High Performance Computing to Perform Onboard Orbit Determination *Tyler Moore - AFIT*	1:50 PM
43DCASS-043 Observability Conditions for Switching Sensing Topology for Cooperative Localization *Anusna Chakraborty - UC* *Rajnikant Sharma - UC*	*43DCASS-109* On the Processing and Electric Properties of nano-Graphene Films using Langmuir-Blodgett Technique *Mohammed Mohammed - WSU* *Dr.Maher S. Amer - WSU*	*43DCASS-107* An Affordable Approach for Robotics Simulation and Testing using Virtual Reality *Zhenyu Shi - UC* *Dr. Catharine McGhan - UC*	*43DCASS-071* Optimal Trajectory Generation in a Dynamic Multi-Body Environment using Pseudospectral Techniques *Jacob Dahlke - AFIT* *Joshuah Hess - AFIT*	2:10 PM
43DCASS-134 Flight Dynamics through Integrated Sensors and Conductive Networks on Parachutes *Joseph D Angelo - DAT* *Maurissa DAngelo - Other* *Nathan Pinion - Other* *Gurwinder Singh - Other*	*43DCASS-096* FE Modeling of Laser Shock Peening Stresses for Fatigue Improvement *Colin Engebretsen - AFIT* *Dr. Anthony Palazotto - AFIT* *Dr. Kristina Langer - AFRL*	*43DCASS-132* Micro-GA Driven Level-Set Based Cellular Division Framework on Structural Shape and Topology Optimization *Hao Li - WSU* *Ramana V. Grandhi - WSU*	*43DCASS-126* Elliptical Orbit Differential Games *Eric Prince - AFIT* *Professor Richard Cobb - AFIT*	2:30 PM
Break				2:50 PM

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P&G = Procter & Gamble
PU = Purdue University
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UBIMS = Univ. Bordeaux
UC = University of Cincinnati
UD = University of Dayton
UDRI = University of Dayton Research Institute
UKY = University of Kentucky
UMD = University of Minnesota Duluth
WSU = Wright State University
WVU = West Virginia University

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AIAA Dayton-Cincinnati Section

Room	116	119	120	127	131
	SESSION 28 **Combustion IV** Chair: Ionio Andrus *AFRL*	SESSION 29 **Turbomachinery** Chair: Michael List *AFRL*	SESSION 30 **Hypersonic Flight** Chair: Nicholas Bisek *AFRL*	SESSION 31 **Flow Control and Acoustics** Chair: Andrew Caswell *AFRL*	SESSION 32 **Unmanned Aerial Systems IV** Chair: Donald Rizzetta *AFRL*
Time					
3:00 PM	*43DCASS-141* The Impacts of Thermal and Mechanistic Wall Conditions on Finger Flame Acceleration *Furkan Kodakoglu - WVU* *Mohammed Alkhabbaz - WVU* *Olatunde Abidakun - WVU* *V'yacheslav Akkerman - WVU*	*43DCASS-085* Characterization and Scaling Study of a Pressure Wave Supercharger *Brian Beasley - AFIT* *Marc Polanka - AFIT* *Justin T. Reinheart - ISSI* *Jacob A. Baranski - ISSI*	*43DCASS-003* Ground Test of Transition for HIFiRE-5b at Flight-Relevant Attitudes *Matthew Borg - AFRL* *Roger L. Kimmel - AFRL*	*43DCASS-020* Assessment of Leading Edge Oscillatory Blowing Applied to Subsonic Cavity Flow using a Triple-Wire Probe *Matthew Wood - AFIT*	*43DCASS-051* Formation Control of Fixed-Wing UAVs for Measuring Atmospheric Turbulence *Christopher Heintz - UKY* *Sean C. C. Bailey - UKY* *Jesse B. Hoagg - UKY*
3:20 PM	*43DCASS-140* Effect of Lewis Number on Finger Flame Acceleration Scenario *Olatunde Abidakun - WVU* *Mohammed Alkhabbaz - WVU* *Furkan Kodakoglu - WVU* *V'yacheslav Akkerman - WVU*	*43DCASS-081* Unsteady Aerodynamics of Blended Fan Blades *Clint Knapke - WSU* *Dr. David Johnston - AFRL* *Dr. Mitch Wolff - WSU*	*43DCASS-033* Thermal Management of Flush-Mounted Sensors for Hypersonic Flight Experiments *Adam Culler - GHI* *Robert A. Jacobsen - GHI* *Zane L. Nitzkorski - GHI* *Michael D. Kurtz - GHI*	*43DCASS-089* Affecting the Wingtip Vortex by Influencing Wing Surface-Flow Direction *Nathan Thomas - UD* *Dr.Sidaard Gunasekaran - UD*	*43DCASS-057* A General Framework for Developing Customizable UAV Flight Control Software using PixHawk Pilot Simulink Support Package and Ground Control Support *Rumit Kumar - UC* *Paul Hans Guentert - UC* *Ethan Fitz - UC* *Dr. Manish Kumar - UC* *Dr. Kelly Cohen - UC*
3:40 PM	*43DCASS-087* A Disk Rotating Detonation Engine Driven Auxiliary Power Unit *Riley Huff - AFIT* *Marc Polanka - AFIT* *Michael J. McClearn - AFRL* *Frederick R. Schauer - AFRL* *Matthew L. Fotia - ISSI* *John L. Hoke - ISSI*	*43DCASS-117* Experimental Investigation of Endwall Flow Control for Front Loaded Turbine Blades *Nathan Fletcher - AFRL* *Christopher R. Marks - AFRL* *Ryan Petrie - AFRL* *Rolf Sondergaard - AFRL* *Mitch Wolff - AFRL*	*43DCASS-121* Mean Flow Perturbation Modelling of Active Flow Control for Supersonic Cavities *Nathaniel Alspach - OSU* *Dr. Datta V. Gaitonde - OSU*	*43DCASS-116* Shock-Trapping Capability of Controlled Cavities in a Transient Unstart Event *Nathan Webb - OSU* *Dennis Omari - OSU* *Mo Samimy - OSU*	*43DCASS-056* Reconfigurable Fault-Tolerant Tilt-Rotor Quadcopter System *Rumit Kumar - UC* *Siddharth Sridhar - UC* *Dr. Manish Kumar - UC* *Dr. Kelly Cohen - UC* *Dr. Franck Cazaurang - UBIMS*
4:00 PM	*43DCASS-012* Injector design and analysis in Rotating Detonation Engines for Rocket Propulsion *Michael Waters - AFIT* *Dr. Carl R Hartsfield - AFIT*	*43DCASS-136* Improved Stall Margin of Novel 1.5 Stage Centrifugal Compressor *Sai Muppana - UC* *Shaaban Abdallah - UC* *Kiran Siddappaji - UC* *Mark Turner - UC*		*43DCASS-063* Experimental Study of Acoustic Emissions of Small Multicopter Unmanned Aerial Systems *Braxton Harter - OSU* *Mark Sutkowy - OSU* *Matthew H. McCrink - OSU* *James W. Gregory - OSU*	*43DCASS-042* Fault Tolerance of a Tilt-Rotor Quadcopter using Sliding Mode Control *Siddharth Sridhar - UC* *Rumit Kumar - UC* *Kelly Cohen - UC* *Manish Kumar - UC*
4:20 PM	Adjourn				

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43rd Dayton-Cincinnati Aerospace Sciences Symposium

133	171	231	282	Room
SESSION 33 **Experimental Applications and Methods** Chair: John Maddox *UKY*	SESSION 34 **Materials, Fatigue, and Fracture II** Chair: Ryan OHara *AFIT*	SESSION 35 **Uncertainty Quantification** Chair: Harok Bae *WSU*	SESSION 36 **Space IV** Chair: Kirk Johnson *AFIT*	Time
43DCASS-018 Dynamic Mass Balancing of a Spacecraft Test Platform *Keith Hudson - AFIT* *Dr. Andrew Lingenfelter - AFIT* *Dr. Joshuah Hess - AFIT* *Dylan Penn - AFRL*	*43DCASS-023* Creep of Nextel 720/A Ceramic Matrix Composite With Laser Drilled Effusion Holes at 1200°C in Air and In Steam *Savannah Minor - AFIT* *M. B. Ruggles-Wrenn - AFIT*	*43DCASS-027* Shortest Path Across Stochastic Network with Correlated Random Arcs *Stephanie Boone - AFIT* *Andrew Geyer - AFIT* *Raymond Hill - AFIT*	*43DCASS-032* Optimization, Integration, and Additive Manufacturing of a CubeSat Structural Bus *Karson Roberts - AFIT*	3:00 PM
43DCASS-059 Measuring Thermal Conductivity of Fibrous Insulation Material Using Comparative Cut-Bar Methodology *Christopher Barrow - UKY* *Marcus L. Irvan - UKY* *John F. Maddox - UKY* *Alexandre Martin - UKY*	*43DCASS-034* Creep of Hi-Nicolan S fiber Tows at 1000°C in Air and in Silicic Acid Saturated Steam *Brian Kroeger - AFIT* *M. B. Ruggles-Wrenn - AFIT*	*43DCASS-047* Minimizing Uncertainty for Multi Target Tracking using Neural Networks *Eshaan Khanapuri - UC* *Rajnikant Sharma - UC*	*43DCASS-127* Project SnowShoe: A Student Organized High Altitude Science Mission *Michael Rosen - UC*	3:20 PM
43DCASS-060 Modeling Verification of Comparative Cut-Bar Apparatus Measuring Thermal Conductivity of Fibrous Insulation Materials *Christopher Barrow - UKY* *John F. Maddox - UKY* *Alexandre Martin - UKY*	*43DCASS-038* Creep of HfB2-20 vol% SiC AT 1500°C in Air *Glen Pry - AFIT* *M.B. Ruggles-Wrenn - AFIT*	*43DCASS-019* Limitations on Advanced Statistical Methods in Uncertainty Quantification *Frank Semmelmayer - AFIT* *Mark Reeder, Ph.D. - AFIT* *Lt Col Richard Seymour, Ph.D. - AFIT*	*43DCASS-128* Project COUPARI: Development Towards Long Duration High Altitude Balloon Missions *Patrick Hodgson - UC*	3:40 PM
43DCASS-131 Getting a Wind Tunnel Approved for Spray Drift Testing by the U.S. Environmental Protection Agency *Sid Gunasekaran - UD* *Aaron Altman - UD* *Kyle Butz - Other*	*43DCASS-039* Tensile Properties and Fatigue Behaviour of Geopolymer Matrix Composites with Carbon Fiber Reinforcement at Elevated Temperature *Steffan Wilcox - AFIT* *Dr. Marina Ruggles-Wrenn - AFIT*	*43DCASS-112* Non-deterministic Multi-Fidelity Approach for Reduced Order Emulator Modeling of Mistuned Rotor Response *Ian Boyd - WSU* *Harok Bae - WSU*	*43DCASS-021* Algorithms for Small Satellite Formation Flying *Robert LaRue - AFIT* *Kirk Johnson - AFIT*	4:00 PM
Adjourn				4:20 PM

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AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS
DAYTON-CINCINNATI SECTION

Volunteers Wanted!!!

If you are a seasoned, well-connected AIAA Fellow, a scientist with other useful skills (photography? publishing?), an aspiring new graduate, or anything in between, we want your help!!!

We have numerous opportunities on our local council for people of all ages and skills. Get involved! We need your ideas and elbow grease to serve and mentor our technical community.

We are always looking for new Council Members. Contact any of our current officers listed below or via our web site at: https://info.aiaa.org/Regions/central/DayCin/default.aspx
and volunteer to lead or help with any of these positions:

Section Co-Chairs	Marc Polanka; Michael List	AFIT; AFRL/RQ	937-255-3636 x4714 937-255-7047	The buck stops here for the execution of all section activities!
Vice Chair	Jeff Hetzel	AFLCMC	937-255-1862	Develop the program agenda for the year and train to become the future chair.
Treasurer	Darius Sanders	AFRL/RQ	937-255-7636	Collect the money and keep the books.
Secretary	Don Rizzetta	AFRL/RQ	937-713-7104	Record the minutes, document the decisions, and assist with official council correspondence.
General Council Members	(Elected Positions)			Contribute your ideas and connections. Volunteer to lead specific programs and activities.
Newsletter Editor	Michael List	AFRL/RQ	937-255-7047	Keep our membership informed of our activities, events, and other news of professional interest.
Webmaster	Margo Ratcliff	NASIC	937-672-4042	Keep website up-to-date with fresh information by working closely with Newsletter Editor and event planners.
Membership Chair	Caleb Barnes	AFRL/RQ	937-713-7103	Promote membership at meetings and events, including membership upgrades and service opportunities within the sectional, regional, and national communities of the AIAA.

Honors/Awards Chair	Marc Polanka	AFIT/ENY	937-255-3636 x4714	Run the section awards program, promote national award opportunities within the section, and plan the year-end awards banquet.
Public Policy Chair	Oliver Leembruggen	Sumaria Systems	937-656-8502	Keep the section informed on AIAA, governmental, and public policy issues from all levels that are important to the aerospace community.
Young Professional Chair	Available			Represent the interests and concerns of our future leaders.
STEM K-12 Outreach	Troy Soileau; Jose Camberos	NASIC; AFRL	937-672-3848 937-713-7055	Advocate the aerospace profession to youth by organizing innovative education activities in the name of AIAA.
College Outreach	Ashlee Youngpeters	QuEST	567-356-0060	Advocated the aerospace profession and membership in the society to our student members.
Technical Committee Coordinator	Available			Coordinates Technical Committee activities with the section
Historian	Marc Polanka	AFIT/ENY	937-255-3636 x4714	Provides historical perspective on Section plans and maintains documentation on Section activity for historical file.
Career and Workforce Development Chair	Rob Mitchel	AFLCMC	937-904-4504	Promote programs for professional development, and keep the section informed of employment opportunities.
Affiliated Societies Delegate & Regional Representatives	Sivaram Gogineni	Spectral Energies	937-266-9570	Liaison between our section and the AIAA Regional Activities Council. Represent the section on Dayton Affiliated Societies Council.
Industry Focal Point	Margo Ratcliff	NASIC	937-672-4042	Industry Focal Point
Social Media Outreach	Oliver Leembruggen	Sumaria Systems	937-656-8502	Focal point for providing session news and events through various social media outlets.

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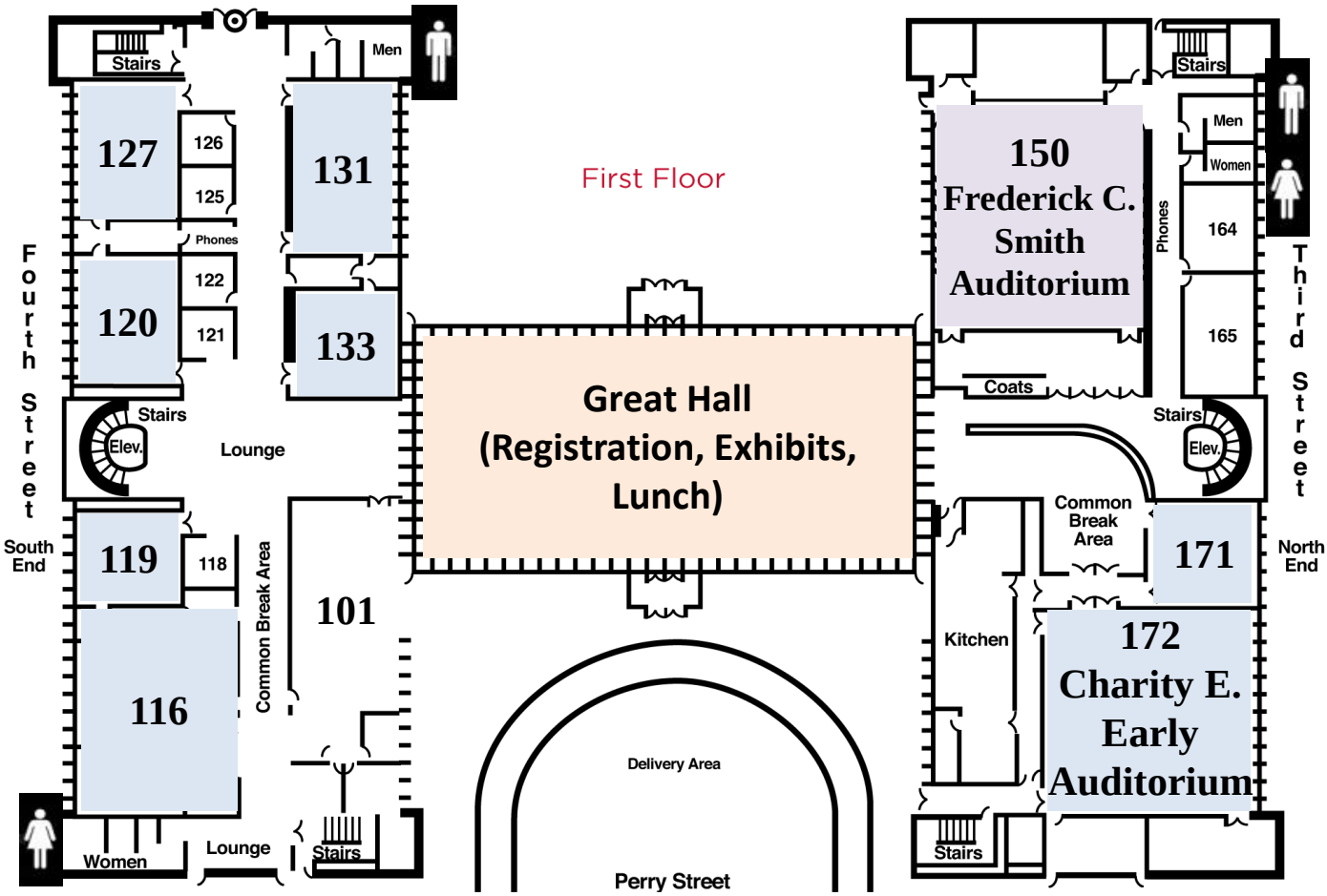

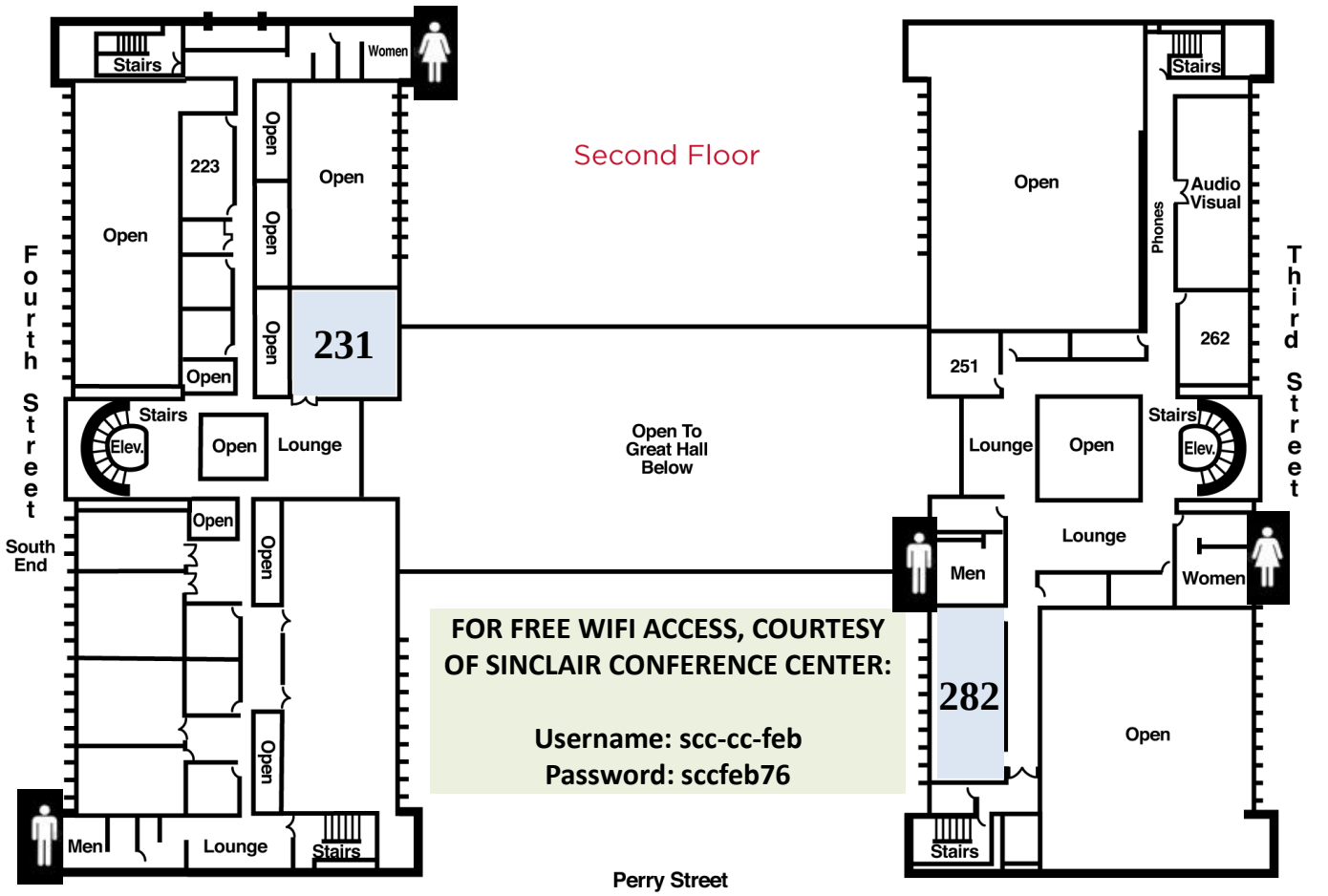

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