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Dayton-Cincinnati Section

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# SYMPOSIUM GUIDE

*The Forty-Fourth Annual*  
**Dayton-Cincinnati**  
**Aerospace Sciences Symposium**



*EARTHRISE: Photograph Taken by Astronaut William Anders  
During the Apollo 8 Mission*

*Image Courtesy of NASA*

**5 March 2019**  
**Sinclair Conference Center**  
**Dayton, Ohio**  
[www.aiaa-daycin.org/dcass](http://www.aiaa-daycin.org/dcass)

Greater Ohio Chapter



Dayton Section



Ohio Valley Section



Human Factors and  
Ergonomics Society



Society for the Advancement  
of Material and Process



# Welcome

to the  
44<sup>th</sup> AIAA Dayton-Cincinnati Aerospace Sciences Symposium  
(DCASS)

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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.

The symposium program includes over 160 technical presentations in both morning and afternoon sessions. Our invited keynote speaker is Mr. Robert Zimmerman, an award winning science journalist and historian. Mr. Zimmerman has written six books and more than a hundred articles on science, engineering, and the history of space exploration, and he will be discussing the often-overlooked flight of Apollo 8.

This year, the DCASS symposium is held in conjunction with the Air Force Institute of Technology Centennial Symposium celebrating its 100<sup>th</sup> anniversary.

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 scheduled for May 22, 2019.

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

Andrew Caswell and Harok Bae  
*2019 DCASS Executive Co-Chairs*

# 44<sup>th</sup> AIAA Dayton-Cincinnati Aerospace Sciences Symposium

## Keynote Program

**Welcome and Announcements:**

**Dr. Andrew Caswell**

*2019 DCASS Executive Chair*

**Keynote Address:**

**How Apollo 8 Won the 1960s Space Race and Changed the World**

**Mr. Robert Zimmerman**

*Award Winning Journalist and Historian*



Though the flight of Apollo 8 was the first human journey to another world, it has largely been forgotten in the ensuing decades amid the glory and excitement of the actual lunar landing in July of 1969, now about to celebrate its 50th anniversary. Yet, this earlier mission probably exerted a much greater influence on human history, coming as it did during Christmas week 1968 at the end of what had been an ugly and violent year. Not only did Apollo 8 give the human race our first view of our mother planet as a globe, it was the success of this mission that actually won the space race. Mr. Zimmerman will tell this story and its still echoing historical impact, describing it from the personal perspective of the three astronauts who flew it.

Robert Zimmerman is an award-winning science journalist and historian who has written six books and more than a hundred articles on science, engineering, and the history of space exploration and technology. He also reports on space and science news at his website, Behind the Black (<http://behindtheblack.com>).

His recent policy paper for the Center for a New American Security, CAPITALISM IN SPACE: PRIVATE ENTERPRISE AND COMPETITION RESHAPE THE GLOBAL AEROSPACE LAUNCH INDUSTRY, documents the recent fast paced changes being wrought worldwide by the new commercial space industry. His newest book, THE UNIVERSE IN A MIRROR: THE SAGA OF THE HUBBLE SPACE TELESCOPE AND THE VISIONARIES WHO BUILT IT (Princeton University Press), tells the story of the people who conceived, built, and saved the Hubble Space Telescope, while his first book, GENESIS, THE STORY OF APOLLO 8 (Mountain Lake Press), just released as an audiobook, describes the epic family and political tale behind the first manned mission to another world.

His magazine and newspaper articles have appeared in ASTRONOMY, AIR & SPACE, SCIENCE, NATURAL HISTORY, THE WALL STREET JOURNAL, USA TODAY, WIRED, INVENTION & TECHNOLOGY and a host of other publications. In 2000 he was co-winner of the David N. Schramm Award, given by the High Energy Astrophysics Division of the American Astronomical Society for Science Journalism, for his essay in THE SCIENCES, "There She Blows," on the 35-year-old astronomical mystery of gamma ray bursts. His third book, LEAVING EARTH: SPACE STATIONS, RIVAL SUPERPOWERS, AND THE QUEST FOR INTERPLANETARY TRAVEL (Joseph Henry Press), won the American Astronomical Society's Eugene M. Emme Astronomical Literature Award in 2003 as that year's best space history for the general public.

In addition to his writing, Mr. Zimmerman is also a cave explorer and cartographer, and has participated in numerous projects exploring and mapping previously unknown caves across the eastern United States. It is this activity that has allowed him to actually "go where no one has gone before," thus providing him a better understanding of the perspective of engineers and scientists as they struggle to push the limits of human knowledge.

# AFIT CENTENNIAL SYMPOSIUM



## Schedule of Events

0700 – 1230	DCASS Registration & Sessions	
1230 – 1330	Lunch	
1330 – 1345	AFIT Centennial Session Welcome & Keynote Speaker Introduction	<b>Dr. Todd Stewart</b> AFIT Chancellor and Director
1345 – 1430	AFIT Centennial Session Keynote Presentation	<b>Dr. Richard Joseph</b> Chief Scientist of the United States Air Force <b>Dr. Michele Gaudreault</b> Technical Director, Office of the Chief Scientist, Headquarters, Air Force Space Command (PhD Aeronautical Engineering, 1993 & M.S. Aeronautical Engineering, 1988)
1430 – 1515	AFIT Centennial Session Alumni Presentation	<b>Ms. Nagin Cox</b> Spacecraft Engineer, Curiosity Flight Team (Mars Science Laboratory), Jet Propulsion Laboratory (M.S. Space Operations, 1990)
1515 – 1545	AFIT Centennial Session Alumni Presentation	<b>Dr. Travis Blake</b> Principal, Physical Sciences, Kairos Ventures (PhD Electrical Engineering, 2006 & M.S. Electrical Engineering 2000)
1545 – 1615	AFIT Centennial Session Alumni Presentation	<b>Major General William Cooley</b> Commander, Air Force Research Laboratory (PhD Applied Physics, 1997)
1615 – 1700	AFIT Centennial Session Alumni Presentation	
1700	AFIT Centennial Session Closing Remarks	<b>Dr. Todd Stewart</b> AFIT Chancellor and Director

## 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 – 4:30 PM

### First Block 8:10 AM – 9:30 AM

1	Combustion I	Room 116
2	Heat Transfer and Thermal Management I	Room 119
3	Materials, Fatigue, and Fracture I	Room 120
4	CFD Application and Methods I	Room 127
5	Fluid Dynamics I	Room 133
6	Uncertainty Quantification & Data Analytics I	Room 164
7	Aircraft Design	Room 165
8	Space Imaging and Detection	Room 171
9	Unmanned Aerial Systems I	Room 231
10	Space I	Room 282

### Second Block 9:50 AM – 11:10 AM

11	Combustion II	Room 116
12	Heat Transfer and Thermal Management II	Room 119
13	Materials, Fatigue, and Fracture II	Room 120
14	CFD Application and Methods II	Room 127
15	Fluid Dynamics II	Room 133
16	Uncertainty Quantification & Data Analytics II	Room 164
17	Flight Dynamics and Control	Room 165
18	Design and Optimization I	Room 171
19	Unmanned Aerial Systems II	Room 231
20	Space II	Room 282

**Keynote Program in Frederick C. Smith Auditorium (Room 150) 11:20 AM – 12:30 PM**

**Lunch in Great Hall 12:30 PM – 1:40 PM**

### Third Block 1:40 PM – 3:00 PM

21	Combustion III	Room 116
22	Advanced Manufacturing I	Room 119
23	Materials, Fatigue, and Fracture III	Room 120
24	CFD Application and Methods III	Room 127
25	Fluid Dynamics III	Room 133
26	Uncertainty Quantification & Data Analytics III	Room 164
27	Turbomachinery I	Room 165
28	Design and Optimization II	Room 171
29	Unmanned Aerial Systems III	Room 231
30	Space III	Room 282

### Fourth Block 3:10 PM – 4:30 PM

31	Combustion IV	Room 116
32	Advanced Manufacturing II	Room 119
33	Hypersonic Systems and Technology	Room 120
34	CFD Application and Methods IV	Room 127
35	Structures	Room 133
36	Acoustics	Room 164
37	Turbomachinery II	Room 165
38	Data Driven Design	Room 171
39	Imaging, Diagnostics, & Sensors	Room 231
40	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](http://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, 11, 21, 31	Design and Optimization	7, 18, 28
Heat Transfer and Turbomachinery	2, 12, 27, 37	Measurement, Acoustics, & Control	8, 17, 36, 39
Materials Science	3, 13, 23	Unmanned Aerial Systems	9, 19, 29
Computational Fluid Dynamics	4, 14, 24, 34	Space Science	10, 20, 30, 40
Fluid Dynamics & Hypersonic Tech	5, 15, 25, 33	Advanced Manufacturing & Structure	22, 32, 35
Uncertainty Quant. & Data Analytics	6, 16, 26, 38		

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!



Room	116	119	120	127	133
	SESSION 1 <b>Combustion I</b>	SESSION 2 <b>Heat Transfer and Thermal Management I</b>	SESSION 3 <b>Materials, Fatigue, and Fracture I</b>	SESSION 4 <b>CFD Application and Methods I</b>	SESSION 5 <b>Fluid Dynamics I</b>
Time	Chair: Andrew Caswell <i>AFRL</i>	Chair: James Rutledge <i>AFRL</i>	Chair: Joy Gockel <i>WSU</i>	Chair: Jeffrey Komives <i>AFIT</i>	Chair: Tim Erdmann <i>ISSI</i>
8:10 AM	<i>44DCASS-073</i> An Experimental Investigation of the Argus Pulsejet Engine of V-1 Buzz Bombs  <i>Vijay Anand - UC</i> <i>Justas Jodele - UC</i> <i>Alexander Zahn - UC</i> <i>Alex Geller - UC</i> <i>Ephraim Gutmark - UC</i>	<i>44DCASS-028</i> Disturbance Rejection for Vapor Cycle Systems  <i>Sunderlin Jackson - AFIT</i> <i>Dr. Anthony Palazotto - AFIT</i> <i>Dr. Meir Pachter - AFIT</i> <i>Dr. Nicholas Niedbalski - AFRL</i>	<i>44DCASS-002</i> Ballistic Testing of Shot Dependency in Composite Materials  <i>Michael Keane - AFIT</i> <i>Maj Andrew Lingenfelter - AFIT</i>	<i>44DCASS-118</i> Computational Investigation of Dual Impinging Jets at Mixed Operating Conditions  <i>Spencer Stahl - OSU</i> <i>Dr. Datta Gaitonde - OSU</i>	<i>44DCASS-087</i> Characterization of Aerotech Shuttering System  <i>Thomas Cook - UD</i> <i>Sidaard Gunasekaran - UD</i>
8:30 AM	<i>44DCASS-166</i> Maturation of a Pulse Detonation Igniter for Scramjet Cavity Ignition  <i>Daniel Cuppoletti - AFRL</i> <i>Timothy Umbrello - AFRL</i>	<i>44DCASS-077</i> Modeling Thin Layers of Materials in Kentucky Aerodynamic Thermodynamic Solver - Material Response  <i>Christen Setters - UKY</i> <i>Rui Fu - UKY</i> <i>Alexandre Martin - UKY</i>	<i>44DCASS-075</i> Progressive Failure in Bolted Hybrid Composite Joints  <i>John Brewer - AFIT</i> <i>Dr. Anthony N. Palazotto - AFIT</i> <i>Michael Falugi - AFRL</i>	<i>44DCASS-138</i> Hybrid Eddy Simulations of Shaped Hole Film Cooling  <i>Michael Boehler - UC</i> <i>Akshay Sudesh - UC</i>	<i>44DCASS-090</i> Investigation of Loss Reduction in a High Lift Turbine by Endwall Jets  <i>Horatio Babcock - AFIT</i> <i>Dr. Mark Reeder - AFIT</i> <i>Dr. Christopher R. Marks - AFRL</i>
8:50 AM	<i>44DCASS-169</i> The relative impacts of driver velocity and residence time on cavity-stabilized flame structure  <i>Kyle B. Brady - NRC</i> <i>Andrew W. Caswell - AFRL</i>	<i>44DCASS-081</i> Integration of a Cooling System for a Comparative Cut-Bar Thermal Conductivity Measurement Apparatus  <i>Gabriella Marie - UKY</i> <i>John F. Maddox - UKY</i> <i>Matthew J. Woods - UKY</i>	<i>44DCASS-004</i> Studying Structural Properties of Well-Aligned Single Wall Carbon Nanotubes Produced Composite by Using Langmuir-Blodgett Technique.  <i>Ali Al Mafarage - WSU</i> <i>Prof. Maher S. Amer - WSU</i>	<i>44DCASS-151</i> Effect of Momentum Flux Ratio on Spray and Vaporization Characteristics for a Liquid Jet in Crossflow  <i>Manu Kamin - UC</i> <i>Prashant Khare - UC</i>	<i>44DCASS-144</i> An Investigation on the Stability of Lid-Driven Cavity Flows at High Mach Numbers  <i>Parshwanath Doshi - OSU</i> <i>Rajesh Ranjan - OSU</i> <i>Datta Gaitonde - OSU</i>
9:10 AM	<i>44DCASS-037</i> Computational Analysis of an Ultra Compact Combustor Using Swirl Stabilization  <i>Daniel Holobeny - AFIT</i> <i>Marc D. Polanka - AFIT</i> <i>Brain T. Bohan - AFIT</i>	<i>44DCASS-154</i> Development of Next Generation High Frequency Double-Sided Heat Flux Gauges  <i>Richard Celestina - OSU</i>	<i>44DCASS-021</i> Mechanical and Vibration Characterization of Hybrid Carbon Nanotube Laminates  <i>James OKeefe - AFIT</i>	<i>44DCASS-114</i> Extension of Morphing Continuum Theory to Canonical Aerodynamic Flows  <i>Louis Wonnell - AFIT</i> <i>Dr. Anthony Palazotto - AFIT</i>	<i>44DCASS-153</i> Effect of Inlet Disturbances on the Dynamics of Impinging Liquid Jets  <i>Jeremy Redding - UC</i> <i>Dr. Prashant Khare - UC</i>
9:30 AM	<b>Break</b>				

Abbreviations:

ABU = Auburn University  
 AFA = Air Force Academy  
 AFIT = Air Force Institute of Technology  
 AFLCMC = Air Force Life Cycle Management Center  
 AFMC = Air Force Materiel Command  
 AFRL = Air Force Research Laboratory

CSU = Central State University  
 FLLC = Folderol, LLC  
 ISSI = Innovative Scientific Solutions Inc.  
 IST = Infoscitex  
 ISU = Iowa State University  
 KTH = KTH Royal Institute of Technology

# 44th Dayton-Cincinnati Aerospace Sciences Symposium

164	165	171	231	282		Room
<b>SESSION 6</b> <b>Uncertainty Quantification &amp; Data Analytics I</b> Chair: James B. Cole <i>AFIT</i>	<b>SESSION 7</b> <b>Aircraft Design</b> Chair: Brian Bohan <i>AFIT</i>	<b>SESSION 8</b> <b>Space Imaging and Detection</b> Chair: Stephen Cain <i>AFIT</i>	<b>SESSION 9</b> <b>Unmanned Aerial Systems I</b> Chair: Mitch Wolff <i>WSU</i>	<b>SESSION 10</b> <b>Space I</b> Chair: Ricahrd Cobb <i>AFIT</i>		Time
<b>44DCASS-095</b> The Statistical Mechanics of Machine Learning  <i>James B. Cole - AFIT Kenneth Hopkinson - AFIT Nicolas Westing - AFIT</i>	<b>44DCASS-048</b> DEJI Systems Model for Aerospace Innovation Development and Integration  <i>Adedeji Badiru - AFIT Sharon Bommer - UD Jinan Andrews - AFIT</i>	<b>44DCASS-043</b> Multi-Hypothesis Test Detection for Star Tracking Systems  <i>Jordan Kirk - AFMC</i>	<b>44DCASS-085</b> USAF Applications of Unmanned Aerial Systems (UAS): A Delphi Study to Examine Current and Future UAS Autonomous Mission Capabilities  <i>Alberto Sigala - AFIT Dr. Brent T. Langhals - AFIT</i>	<b>44DCASS-017</b> Atmospheric Reentry Hemisphere Prediction for Prograde Orbits Using Logical Disjunction  <i>Robert Bettinger - AFIT</i>		8:10 AM
<b>44DCASS-156</b> A Multi-Variate Machine Learning Framework to Predict Flow Dynamics of Liquid Jet Vaporization in Air Crossflow  <i>Himakar Ganti - UC Prashant Khare - UC</i>	<b>44DCASS-101</b> A Unified Approach to Thermodynamic Cycle Analysis - with Application to Hypersonic Propulsion System Performance  <i>Jose A. Camberos - AFRL</i>	<b>44DCASS-010</b> Super-resolution imaging via expectation-maximization estimation of near stellar neighborhoods  <i>Stephen Cain - AFIT</i>	<b>44DCASS-051</b> Steps Towards Automatic Evaluation of UAV Delivery Operations Using ROS and Gazebo  <i>Ponaravind Muthaiah - UC Dr. Catharine McGhan - UC</i>	<b>44DCASS-018</b> Linear Model for Reentry Time Prediction of Spacecraft in Low-Eccentricity, Low Earth Orbits  <i>Robert Bettinger - AFIT</i>		8:30 AM
<b>44DCASS-168</b> Uncertainty Evaluation in the Design of Structural Health Monitoring Systems for Damage Detection  <i>Kevin Lin - AFIT Christine Schubert Kabban - AFIT Richard Uber - AFIT Kevin Lin - AFIT Bin Lin - Other</i>	<b>44DCASS-027</b> Changes in Propeller Performance Due to Ground Proximity  <i>Jielong Cai - UD Sidaard Gunasekaran - UD Anwar Ahmed - ABU Michael OL - FLLC</i>	<b>44DCASS-068</b> Improving Near-Earth Space Object Detection Using a Short Exposure Image Frame Selection Technique  <i>David Becker - AFIT Dr. Stephen Cain - AFIT</i>	<b>44DCASS-091</b> Autonomous Indoor Flight in GPS Denied, Degraded Environments  <i>James Wells - UC Aditya Deshpande - UC Rumit Kumar - UC Anuj Ssaxena - UC Bryan Brown - UC Dieter Vanderelst - UC Manish Kumar - UC</i>	<b>44DCASS-117</b> 6-DOF Constrained Optimal Satellite Inspection Trajectories  <i>Mark Mercier - AFIT Kirk Johnson - AFIT</i>		8:50 AM
<b>44DCASS-065</b> Reinforcement Learning for Control-input Maneuvering of Small UAS  <i>Justin Merrick - AFIT Donald Kunz - AFIT Joseph Curro - AFIT</i>	<b>44DCASS-104</b> Wing Performance Changes Due to Wing Surface Contours  <i>Faith Loughnane - UD Rachael Supina - UD Sidaard Gunasekaran-UD</i>	<b>44DCASS-025</b> Star Tracker Accuracy Improvement and Optimization for Attitude Measurement in Three-Axis  <i>Michael Lichter - AFIT</i>	<b>44DCASS-133</b> Evaluation of Unmanned Aircraft Flying Qualities Using a Stitched Learjet Model  <i>Patrick Callaghan - AFIT Dr. Donald Kunz - AFIT</i>	<b>44DCASS-161</b> Energy Analysis and Orbit Simulation of Actuated CubeSat Solar Arrays  <i>Justin Ehren - UD David H. Myszka - UD Andrew P. Murray - UD</i>		9:10 AM
<b>Break</b>						9:30 AM

MU = Miami University  
 NARC = NASA Ames Research Center  
 NRC = National Research Council  
 OAI = Ohio Aerospace Institute  
 OSU = The Ohio State University  
 SBU = Stony Brook University

SE = Spectral Energies LLC  
 SLU = St. Louis University  
 UC = University of Cincinnati  
 UD = University of Dayton  
 UDRI = University of Dayton Research Institute  
 UKY = University of Kentucky

UT = University of Texas  
 WSU = Wright State University  
 WVU = West Virginia University

Room	116	119	120	127	133
	SESSION 11 <b>Combustion II</b>  Chair: Marc D. Polanka <i>AFIT</i>	SESSION 12 <b>Heat Transfer and Thermal Management II</b>  Chair: Larry Byrd <i>AFRL</i>	SESSION 13 <b>Materials, Fatigue, and Fracture II</b>  Chair: Ryan O'Hara <i>AFIT</i>	SESSION 14 <b>CFD Application and Methods II</b>  Chair: Jacob Freeman <i>AFIT</i>	SESSION 15 <b>Fluid Dynamics II</b>  Chair: Mark Reeder <i>AFIT</i>
9:50 AM	44DCASS-035 Experimental Flow Visualization in a Radial Rotating Detonation Engine  <i>Scott Boller - AFIT Marc D. Polanka - AFIT Frederick R. Schauer - AFIT Riley Huff - AFRL Matthew L. Fotia - ISSI</i>	44DCASS-007 A Computational Technique to Evaluate the Relative Influence of Cooling on Overall Effectiveness  <i>Carol Bryant - AFRL James L Rutledge - AFIT</i>	44DCASS-061 Fracture Toughness and Fatigue Crack Growth Rate of Inconel 718 Formed by Laser Powder Bed Fusion  <i>Charles Hohnbaum - AFIT</i>	44DCASS-155 Unsteady incompressible flow simulation using new non-primitive formulation  <i>Omar Lopez Rodriguez - UC Shaaban Abdallah - UC</i>	44DCASS-099 Behavior Fluid Flow through Porous Materials  <i>Sharon Edward - UKY Dr. Grana Otero - UKY</i>
10:10 AM	44DCASS-056 Analytical Methods and Preliminary Results of OH* Chemiluminescence of Rotating Detonating Combustor Operation  <i>Nathaniel Chiles - UC Justas Jodele - UC Alexander Zahn - UC Vijay Anand - UC Ephraim Gutmark - UC</i>	44DCASS-058 Design of a Compact CO2 Cooling System  <i>Christopher Ruscher - SE Sivaram Gogineni - SE Rory Roberts - WSU</i>	44DCASS-063 Creep Performance & Microstructural Mechanisms of Ultra-High Temperature Ceramics in Argon at 1550°C - 1650°C  <i>Michael Wilkinson - AFIT Marina B. Ruggles-Wrenn - AFIT</i>	44DCASS-049 Compressible Flow Through a Diffusing Serpentine Inlet Duct Assessed with Wall-Modeled Large Eddy Simulation  <i>Ryan Thompson - AFIT Jeffrey R. Komives - AFIT</i>	44DCASS-145 Unified solver based on Volume Averaged Navier-Stokes equations for porous flow modelling  <i>Umran Duzel - UKY Alexandre Martin - UKY</i>
10:30 AM	44DCASS-038 Scramjet Operability and RDE Design for RDE Piloted Scramjet  <i>Ryan Druss - AFIT Marc D. Polanka - AFIT Timothy M. Ombrello - AFRL Matthew L. Fotia - ISSI</i>	44DCASS-072 Semi-Empirical Measurement of Thermal Conductivity in Fibrous Insulation Materials  <i>Christopher Barrow - UKY John F. Maddox - UKY</i>	44DCASS-164 CREEP BEHAVIOR IN INTERLAMINAR SHEAR OF A Hi-NICALON/SiC CERAMIC MATRIX COMPOSITE AT 1300°C IN AIR AND IN STEAM  <i>Tyler Wallis - AFIT M. B. Ruggles-Wrenn - AFIT</i>	44DCASS-033 Tracking Shock Movement on the Surface of an Oscillating, Straked Delta Wing  <i>Justin Pung - AFIT Darrell S. Crowe - AFIT</i>	44DCASS-110 Effect of Slotted Winglet on the Wingtip Vortex  <i>Josh Deslich - UD Sidaard Gunasekaran - UD</i>
10:50 AM	44DCASS-054 Effect of Channel Width, Mass Flow Rate, and Equivalence Ratio on Thrust Generated by a Rotating Detonation Combustor  <i>Alexander Geller - UC Alexander Zahn - UC Justas Jodele - UC Vijay Anand - UC Ephraim Gutmark - UC</i>	44DCASS-040 Experimental Evaluations For Scaling Gas Turbine Cooling Effectiveness On Flat Plate Geometry  <i>Luke McNamara - AFIT James L. Rutledge - AFIT Marc D. Polanka - AFIT</i>	44DCASS-165 Creep of Nextel 720/A Ceramic Matrix Composite with Diamond-Drilled Effusion Holes at 1200°C in Air and in Steam  <i>Megan Harkins - AFIT Dr. Marina Ruggles-Wrenn - AFIT</i>	44DCASS-112 Verification and Considerations of Discrete Adjoint CFD solutions.  <i>Matteo Ugolotti - UC Dr Paul Orkwis - UC Dr Mark Turner - UC</i>	44DCASS-121 Direct Numerical Simulation of Transition Control via Local Dynamic Surface Modification  <i>Donald Rizzetta - AFRL Miguel R. Visbal - AFRL</i>
11:10 AM	<b>Break</b>				
11:20 AM	Room 150 - Frederick Smith Auditorium  <b>Welcome &amp; Announcements</b>  Dr. Andrew Caswell, 44 <sup>th</sup> DCASS General Chair				
12:30 PM	<b>Networking Lunch</b>				



# 44th Dayton-Cincinnati Aerospace Sciences Symposium

164	165	171	231	282		Room
<p>SESSION 16 <b>Uncertainty Quantification &amp; Data Analytics II</b> Chair: Harok Bae WSU</p>	<p>SESSION 17 <b>Flight Dynamics and Control</b> Chair: Donald Kunz AFIT</p>	<p>SESSION 18 <b>Design and Optimization I</b> Chair: Nicholas Truster AFRL</p>	<p>SESSION 19 <b>Unmanned Aerial Systems II</b> Chair: Daniel Cuppoletti AFRL</p>	<p>SESSION 20 <b>Space II</b> Chair: Kirk Johnson AFIT</p>		Time
<p>44DCASS-008 Multi-Fidelity Sparse Polynomial Chaos Surrogate Models for Flutter Databases  Markus Rumpfkeil - UD Phil Beran - AFRL</p>	<p>44DCASS-015 A Rigorous, Analytical Discussion of Rigid-Body Kinematics  Donald Kunz - AFIT</p>	<p>44DCASS-022 CubeSat Payload Thermal Management Optimization  Matthew Krott - AFIT Maj Robert A. Bettinger - AFIT</p>	<p>44DCASS-047 Distributed Bidding-Based Detect-and-Avoid for Multiple Unmanned Aerial Vehicles in National Airspace  Drew Scott - UC Mohammadreza Radmanesh - UC Mohammad Sarim - UC Aditya Deshpande - UC Manish Kumar - UC</p>	<p>44DCASS-044 Targeted Ion Radiation of AlGaN/GaN High Electron Mobility Transistors  Melanie Mace - AFIT John McClory - AFIT Eric Heller - AFRL</p>		9:50 AM
<p>44DCASS-120 Multi-Fidelity Modeling using Non-Deterministic Localized-Galerkin Approach  Atticus Beachy - WSU Harok Bae - WSU Daniel L. Clark Jr. - AFRL Joshua D. Deaton - AFRL Edwin E. Forster - AFRL</p>	<p>44DCASS-041 Automatic Ground Collision Avoidance System for Performance Limited Aircraft Using a Stitched Learjet-25D Model  James Carpenter - AFIT Capt Chris Gahan - AFIT Dr. Richard Cobb - AFIT</p>	<p>44DCASS-029 Multidisciplinary, Multifidelity Aircraft Design Models with CAPS  Dean Bryson - AFRL</p>	<p>44DCASS-067 Decentralized Adaptive Control for Multi-UAV Cooperative Transport of a Payload With Variable/Offset Center of Gravity  Shraddha Barawkar - UC Manish Kumar - UC</p>	<p>44DCASS-060 Characterization and Anomalous Diffusion Analysis of a 100W Hall Effect Thruster  Megan Maikell - AFIT</p>		10:10 AM
<p>44DCASS-126 Classification Decision Boundary for Mode Shape Emulation  Ian Boyd - WSU Harok Bae - WSU Emily Carper - AFRL Jeff Brown - AFRL</p>	<p>44DCASS-086 Quaternion Feedback Based Full Pose Control of a Quadcopter UAV with Thrust Vectoring Capabilities  Rumit Kumar - UC Aditya Milind Deshpande-UC Siddharth Sridhar - UC Kelly Cohen - UC Manish Kumar - UC</p>	<p>44DCASS-167 CFD-Based Machine Learning Methodology for Combustor Design Optimization  Nathan Thomas - UD Markus Rumpfkeil - UD Alejandro Brijones - UDRI Brent Rankin - AFRL Timothy Erdmann Jr. - ISSI</p>	<p>44DCASS-096 Front Collision Detection System of Unmanned Ground Vehicle Using 90nm CMOS  Shuo Li - WSU Brielle Cummings - CSU Julian Salas - UT Syed Mukarram Ali - SBU</p>	<p>44DCASS-116 Manufacture of Fused Deposition Modeling Joints using ULTEM 9085  Zane Willburn - AFIT</p>		10:30 AM
<p>44DCASS-100 Mesoscale thermo-structural analysis of inhomogeneities in ablative materials using statistical distribution of properties derived at the microscale  Sean McDaniel - UKY Alexandre Martin - UKY Matthew Beck - UKY Jonathon Wenk - UKY</p>	<p>44DCASS-074 Genetic Fuzzy Systems for Decentralized Control of Collaborative Robots  Anoop Sathyan - UC Ou Ma - UC Kelly Cohen - UC</p>	<p>44DCASS-130 Aircraft Thermal Management Optimization using Reinforcement Learning  Andrew Ellicott - WSU</p>	<p>44DCASS-134 Design of a Path Planning Algorithm Utilizing Graph Theory for Real-Time Applications  Captain J. Austin Rivera - AFIT Dr. David Jacques - AFIT Dr. Richard Cobb - AFIT Dr. David Grymin - AFRL</p>	<p>44DCASS-122 Colloid Thruster Performance Characterization Using A Force Balance Stand  Charles Garlisi - AFIT Dr. Carl Hartsfield - AFIT</p>		10:50 AM
<b>Break</b>						11:10 AM
Room 150 - Frederick Smith Auditorium						
<p>Keynote Address</p> <p><b>How Apollo 8 Won the 1960's Space Race and Changed the World</b></p> <p>Robert Zimmerman, <i>Award Winning Journalist and Historian</i></p>						11:20 AM
<b>Networking Lunch</b>						12:30 PM

Room	116	119	120	127	133
	SESSION 21 <b>Combustion III</b>  Chair: Kyle B. Brady	SESSION 22 <b>Advanced Manufacturing I</b>  Chair: Ryan Kemnitz	SESSION 23 <b>Materials, Fatigue, and Fracture III</b>  Chair: Marina Ruggles-Wrenn	SESSION 24 <b>CFD Application and Methods III</b>  Chair: Donald Rizzetta	SESSION 25 <b>Fluid Dynamics III</b>  Chair: Brian Bohan
Time	NRC	AFIT	AFIT	AFRL	AFIT
1:40 PM	44DCASS-080 Flame Stability for a Premixed Jet in Vitiated Coflow  <i>Tyler Owens - UKY Stephen Grib - UKY Michael Renfro - UKY</i>	44DCASS-137 Investigating surface finish, burr formation and tool wear during machining of 3D printed CFRP composites  <i>Nicholas Cococetta - MU David Pearl - MU Muhammad P. Jahan - MU</i>	44DCASS-150 Investigating the Elastic Tensile and Shear Performance of BBC Lattice Structures Based on Strut Size and Inclination  <i>Hasanain Abdulhadi - WSU Ahsan Mian - WSU</i>	44DCASS-071 Design of a Wind-Tunnel Wall Mounted Cavity Model with Active and Passive Control of the Incoming Boundary Layer Height  <i>Rachelle Speth - AFRL Scott Sherer - AFRL</i>	44DCASS-069 Lagrangian Coherent Structures of Vortex Ring Formation and Advection  <i>Braxton Harter - OSU Dr. Matthew H. McCrink - OSU Dr. James W. Gregory - OSU</i>
2:00 PM	44DCASS-098 Numerical Validation and Study of Lean Premixed Combustion  <i>Kranthi Yellugari - UC Rodrigo Villalva Gomez - UC Ephraim Gutmark - UC</i>	44DCASS-031 Process Parameter Development of Additively Manufactured AF9628 Weapons Steel  <i>Erin Hager - AFIT Major Ryan O'Hara - AFIT</i>	44DCASS-001 Computational Modeling for High Strain Rate Response of Advanced Materials  <i>Derek Spear - AFIT Dr. Anthony Palazotto - AFIT</i>	44DCASS-097 Comparison of Computational and Experimental Results on a Transonic Hemisphere  <i>David Weston - OAI Scott Sherer - AFRL</i>	44DCASS-123 Effect of upsweep on the streamwise vortices in the wake of a cut cylinder  <i>Matthew Aultman - OSU Datta Gaitonde - OSU</i>
2:20 PM	44DCASS-076 High-Gravity Effects on Premixed Flames via Centrifugal Forces  <i>Tim Erdmann - ISSI Andrew Caswell - AFRL Ephraim Gutmark - UC</i>	44DCASS-106 The Influence of the Micro-structure Parameters on the Elastic Response of BBC Lattice Structures  <i>Hasanain Abdulhadi - WSU Ahsan Mian - WSU</i>	44DCASS-115 Pressure Impulse Matching via Hooke-Jeeves Data Matching  <i>Colin Engebretsen - AFIT Dr. Anthony Palazotto - AFIT Dr. Kristina Langer - AFRL</i>	44DCASS-162 Validation of Lagrangian Particle-Tracking Code for Analysis and Prediction of Spallation from Thermal Protection Systems  <i>Raghava S. C. Davuluri-UKY Sean C. C. Bailey - UKY Kaveh A. Tagavi - UKY Alexandre Martin - UKY</i>	44DCASS-135 Direct Numerical Simulations of Turbulent Channel Flows with Sinusoidal Walls  <i>Sparsh Ganju - UKY Jefferson Davis - UKY Sean C. C. Bailey - UKY Christoph Brehm - UKY</i>
2:40 PM	44DCASS-152 Dynamics of Supercritical Premixed Oxy-Methane Flames with CO2 dilutions in Obstructed Tubes "Bychkov Tubes"  <i>Abdulafeez Adebisi - WVU Vyacheslav - WVU</i>	44DCASS-102 Impact behavior of 3D printed polymer lattice structure: Experimental and finite element study.  <i>Abdalsalam Fadeel - WSU Ahsan Mian - WSU Raghavan Srinivasan - WSU</i>	44DCASS-034 Improving the isotropy of LPBF IN718 via supersolvus annealing  <i>David Newell - AFIT Ryan O'Hara - AFIT Anthony Palazotto - AFIT Greg Cobb - AFIT Ben Doane - AFIT</i>	44DCASS-066 Experimental Validation for Globally Optimized Tractor-Trailer Base Flaps  <i>Jacob Freeman - AFIT Mark F. Reeder - AFIT Anna C. Demoret - AFIT</i>	44DCASS-131 Direct Numerical Simulation of Rotating Turbulent Pipe Flows at Moderate Reynolds Numbers  <i>Jefferson Davis - UKY Sparsh Ganju - UKY Sean Bailey - UKY Christoph Brehm - UKY</i>
3:00 PM	<b>Break</b>				

**Abbreviations:**

ABU = Auburn University

AFA = Air Force Academy

AFIT = Air Force Institute of Technology

AFLCMC = Air Force Life Cycle Management Center

AFMC = Air Force Materiel Command

AFRL = Air Force Research Laboratory

CSU = Central State University

FLLC = Folderol, LLC

ISSI = Innovative Scientific Solutions Inc.

IST = Infoscitex

ISU = Iowa State University

KTH = KTH Royal Institute of Technology

# 44th Dayton-Cincinnati Aerospace Sciences Symposium

164	165	171	231	282	150	Room
<b>SESSION 26</b> <b>Uncertainty Quantification &amp; Data Analytics III</b> Chair: Markus Rumpfkeil  <i>UD</i>	<b>SESSION 27</b> <b>Turbomachinery I</b> Chair: Michael List  <i>AFRL</i>	<b>SESSION 28</b> <b>Design and Optimization II</b> Chair: Carl Hartsfield  <i>AFIT</i>	<b>SESSION 29</b> <b>Unmanned Aerial Systems III</b> Chair: John Maddox  <i>UKY</i>	<b>SESSION 30</b> <b>Space III</b> Chair: Joshua Hess  <i>AFIT</i>	<b>AFIT CENTENNIAL SYMPOSIUM</b>	Time
<b>44DCASS-083</b> Statistically-Applied Nonuniformity Correction  <i>Adrian Catarius - AFIT</i> <i>Nicholas Yielding - AFIT</i> <i>Stephen Cain - AFIT</i> <i>Michael Seal - AFIT</i>	<b>44DCASS-070</b> The Effect of Temperature and Melting Relative to Particle Deposition in Gas Turbines  <i>Nicholas A. Plewacki - OSU</i> <i>Nathan D. Libertowski - OSU</i> <i>Dr. Jeffrey P. Bons - OSU</i>	<b>44DCASS-011</b> A Mixed Integer Programming Framework for the Fuel Optimal Guidance of Complex Rendezvous and Proximity Operation Missions  <i>Andrew LeValley - AFIT</i> <i>Dr. Richard Cobb - AFIT</i>	<b>44DCASS-046</b> Tilt-Rotor Quadcopter: Hardware based Dynamics, Smart Sliding Mode Controller, Attitude Hold & Wind Disturbance Scenarios  <i>Siddharth Sridhar - UC</i> <i>Gaurang Gupta - UC</i> <i>Rumit Kumar - UC</i> <i>Manish Kumar - UC</i> <i>Kelly Cohen - UC</i>	<b>44DCASS-140</b> Constrained Spacecraft Attitude Reorientation via Model Predictive Control  <i>Costantinos Zagaris - AFIT</i>	Please join us in the  <b>Frederick C. Smith Auditorium (Room 150)</b>  for the  <b>AFIT CENTENNIAL SYMPOSIUM!</b>  For a detailed schedule of events, please refer to page 4.	1:40 PM
<b>44DCASS-139</b> Strategic Anchoring Through Information Presentation  <i>Joseph Kristbaum - WSU</i> <i>Dr. Frank Ciarallo - WSU</i>	<b>44DCASS-084</b> Investigation of Thermal Scaling Effects for a Simulated Turbine Leading Edge  <i>Ryan Lynch - AFIT</i> <i>Marc D. Polanka - AFIT</i> <i>James L. Rutledge - AFIT</i>	<b>44DCASS-032</b> Dubins Paths as an initial guess for Bezier Curve Optimization  <i>Shawn Stephens - AFIT</i> <i>Donald Kunz - AFIT</i> <i>David Casbeer - AFRL</i> <i>Satyanarayana Gupta Manyam - IST</i>	<b>44DCASS-062</b> Building a UAV system model for use in gusting environments  <i>Ryan Thorpe - OSU</i> <i>Achal Singhal - OSU</i> <i>Matthew H. McCrink - OSU</i> <i>James W. Gregory - OSU</i>	<b>44DCASS-024</b> Utility of Modular Attitude Determination and Control Subsystems for Small Satellites  <i>Chris Lomanno - AFIT</i> <i>Maj Robert A. Bettinger - AFIT</i>		2:00 PM
<b>44DCASS-143</b> Detection System Fusion based on the Predictive Value Curve and its Variations  <i>Mark Oxley - AFIT</i> <i>Christine M. Schubert Kabban - AFIT</i>	<b>44DCASS-105</b> Experimental Investigation of a Spanwise Axis Turbine in a Symmetric Wing  <i>Neal Novotny - UD</i> <i>Jielong Cai - UD</i> <i>Sidaard Gunasekaran - UD</i>	<b>44DCASS-142</b> Limited Maneuvers applied to Differential-Drag Formation Control  <i>Talon Townley - AFIT</i> <i>Kirk W. Johnson - AFIT</i>	<b>44DCASS-057</b> Modular System Architecture for an Aerial Manipulator  <i>Jishu Medhi - UC</i> <i>Dr. Catharine McGhan - UC</i>	<b>44DCASS-132</b> Open- and Closed-Loop Neural Network Control for Proximal Spacecraft Maneuvers  <i>Cole George - AFIT</i> <i>Joshuah A. Hess - AFIT</i> <i>Richard G. Cobb - AFIT</i>		2:20 PM
<b>44DCASS-030</b> Near Earth Space Object Detection Utilizing Parallax as Multi-hypothesis Test Criterion  <i>Joseph Topmkins - AFRL</i> <i>Dr. Stephen C. Cain - AFIT</i> <i>David J.R. Becker - AFIT</i>	<b>44DCASS-050</b> Swirling Flow Dynamics of a Practical Gaseous Fuel Direct-Injection Swirler.  <i>Mohamad Ghulam - UC</i> <i>Yazhou Shen - KTH</i> <i>Rodrigo Villalva Gomez - UC</i> <i>Ephraim Gutmark - UC</i> <i>Christophe Duwig - KTH</i>	<b>44DCASS-111</b> Computational Simulations Towards Optimal Design of Efficient Staged Pressurized Oxy-Coal Combustion  <i>Gideon Udochukwu - WVU</i> <i>V'yacheslav Akkerman - WVU</i> <i>Ismail Celik - SLU</i> <i>Richard Axelbaum - SLU</i>	<b>44DCASS-079</b> Small-Scale Rotor Design Variables and Their Effects on Aerodynamic and Aeroacoustic Performance  <i>Quinten Henricks - OSU</i> <i>Dr. Zhenyu Wang - OSU</i> <i>Dr. Mei Zhuang - OSU</i>	<b>44DCASS-059</b> Comprehensive Study of Optimal Synergetic Skip Entries with Dynamic Thrust Vectoring Control  <i>Jeremiah Webb - AFIT</i> <i>Roberty A. Bettinger - AFIT</i>		2:40 PM
<b>Break</b>						3:00 PM

MU = Miami University  
 NARC = NASA Ames Research Center  
 NRC = National Research Council  
 OAI = Ohio Aerospace Institute  
 OSU = The Ohio State University  
 SBU = Stony Brook University

SE = Spectral Energies LLC  
 SLU = St. Louis University  
 UC = University of Cincinnati  
 UD = University of Dayton  
 UDRI = University of Dayton Research Institute  
 UKY = University of Kentucky

UT = University of Texas  
 WSU = Wright State University  
 WVU = West Virginia University



Room	116	119	120	127	133
	SESSION 31 <b>Combustion IV</b> Chair: Michael Renfro <i>UKY</i>	SESSION 32 <b>Advanced Manufacturing II</b> Chair: Robert Lowe <i>UD</i>	SESSION 33 <b>Hypersonic Systems and Technology</b> Chair: Matthew Tufts <i>AFRL</i>	SESSION 34 <b>CFD Application and Methods IV</b> Chair: Scott Sherer <i>AFRL</i>	SESSION 35 <b>Structures</b> Chair: Anthony Palazotto <i>AFIT</i>
3:10 PM	<i>44DCASS-107</i> Analytical Predictive Formulation for a Combustion Process in an Obstructed Coalmining Tunnel <i>Furkan Kodakoglu - WVU</i> <i>V'yacheslav Akkerman - WVU</i>	<i>44DCASS-175</i> Compression Behavior of 3D Printed Hollow Structures <i>Kishan Bhalodia - WSU</i> <i>Karan Hingraja - WSU</i> <i>Dr.Ahsan Mian - WSU</i>	<i>44DCASS-003</i> Computational Investigation of Effective Trip Heights in Hypersonic Flows <i>Matthew Tufts - AFRL</i> <i>Nicholas Bisek - AFRL</i> <i>Roger Kimmel - AFRL</i> <i>Robert Mallinak - AFA</i>	<i>44DCASS-013</i> Effects of Lossy Compression on the Analysis of Unsteady CFD Data <i>Tim Leger - OAI</i> <i>Nicholas Bisek - AFRL</i>	<i>44DCASS-136</i> Fluid-Structure Interaction of a Celestial Icosahedron Vacuum Lighter Than Air Vehicle <i>Dustin Graves - AFIT</i> <i>Dr. Anthony Palazotto - AFIT</i> <i>Dr. Mitch Wolff - WSU</i>
3:30 PM	<i>44DCASS-108</i> Analysis of the Diffusional-Thermal Instability on the Flame Dynamics in Obstructed Channel with both Extremes Open <i>Olatunde Abidakun - WVU</i> <i>Abdulafeez Adebiji - WVU</i> <i>V'yacheslav - WVU</i>	<i>44DCASS-119</i> The Influence of Additive Manufacturing Surface Roughness on Fatigue Performance <i>Joy Gockel - WSU</i> <i>Luke Sheridan - AFRL</i> <i>Bo Whip - WSU</i> <i>Brittanie Koerper - WSU</i>	<i>44DCASS-005</i> Effects of Carbon Dioxide on Hypersonic Boundary Layer Stability over Sharp and Blunt Cones <i>Olivia Elliott - AFIT</i> <i>Robert B. Greendyke - AFIT</i> <i>Joseph S. Jewell - SE</i> <i>Lt Col Jeffrey R. Komives - AFIT</i>	<i>44DCASS-088</i> Development and Performance Assessment of Automatic Partitioning Algorithms for Structured Overset Grids <i>Scott Sherer - AFRL</i> <i>Daniel Garmann - AFRL</i>	<i>44DCASS-141</i> Simulation of Fluid-Structure Interactions with Geometrically Nonlinear Deformations <i>Jonathan Boustani - UKY</i> <i>Michael F. Barad - NARC</i> <i>Cetin C. Kiris - NARC</i> <i>Jonathan F. Wenk - UKY</i> <i>Christoph Brehm - UKY</i>
3:50 PM	<i>44DCASS-039</i> Development of a Test Bench to Study the Impact on Performance of Single and Dual Cylinder Internal Combustion Engines at Altitude <i>Andrew Mayeux - AFIT</i> <i>Marc D. Polanka - AFIT</i> <i>Jason R. Blantin - AFIT</i>	<i>44DCASS-159</i> Finite-Element Modeling of the Deformation and Failure of Additively Manufactured ULTEM 9085 During High-Speed Instrumented Impact Testing <i>Alex Elsbrock - UD</i> <i>Robert L. Lowe - UD</i> <i>Thomas J. Whitney - UD</i>	<i>44DCASS-016</i> Direct Numerical Simulation of Roughness Induced Hypersonic Boundary Layer Transition on a Seven-Degree Half-Angle Cone <i>Tara Crouch - AFIT</i> <i>Lt Colonel Jeffery R. Komives - AFIT</i>	<i>44DCASS-089</i> Structured Overset Grid Contribution to the Second Grid and Mesh Generation Workshop <i>Scott Sherer - AFRL</i> <i>Michael T. Frede - AFRL</i> <i>James "Ben" Lewis - AFLCMC</i>	<i>44DCASS-113</i> Lighter than Air Vehicles Considering an Internal Vacuum - A Status Update <i>Ruben Adorno - AFIT</i> <i>Dr. Anthony N. Palazotto - AFIT</i>
4:10 PM	<i>44DCASS-178</i> Numerical Investigation of an Experiment for Reacting Rayleigh-Taylor Instabilities <i>Joshua Sykes - ISSI</i> <i>Timothy Gallagher - ISSI</i> <i>Brent Rankin - AFRL</i>	<i>44DCASS-042</i> Application of Metamaterials for Multifunctional Satellite Bus Enabled via Additive Manufacturing <i>Michael Macchia - AFIT</i> <i>Ryan P. O'Hara - AFIT</i>	<i>44DCASS-147</i> An Energy-Based Decomposition Analysis of Hypersonic Transition Reversal on Blunt Bodies <i>Hemanth Goparaju - OSU</i> <i>B. Teitelbaum - OSU</i> <i>S. Unnikrishnan - OSU</i> <i>D. Gaitonde - OSU</i>	<i>44DCASS-157</i> Simulation of blood flow in human aorta with valve <i>Raghuvir Jonnagiri - UC</i> <i>Dr. Elias Sundstrom - UC</i> <i>Dr. Iris Gutmark-Little - UC</i> <i>Dr. Ephraim Gutmark - UC</i> <i>Dr. Justin Tretter - UC</i>	<i>44DCASS-149</i> Characterization and Adaptive Control of Motion Test Apparatus for a Subsonic Wind Tunnel <i>Kyra Schmidt - AFIT</i> <i>Dr. Richard Cobb - AFIT</i>
4:30 PM	Adjourn				

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# 44th Dayton-Cincinnati Aerospace Sciences Symposium

164	165	171	231	282	150	Room
SESSION 36 <b>Acoustics</b> Chair: Rachele Speth AFRL	SESSION 37 <b>Turbomachinery II</b> Chair: Rolf Sondergaard AFRL	SESSION 38 <b>Data Driven Design</b> Chair: Jose A. Camberos AFRL	SESSION 39 <b>Imaging, Diagnostics, &amp; Sensors</b> Chair: Levi Thomas AFIT	SESSION 40 <b>Space IV</b> Chair: Costantinos Zagaris AFIT	<b>AFIT CENTENNIAL SYMPOSIUM</b>	Time
44DCASS-129 Numerical Investigation of Low-Noise Airfoils Inspired by the Down Coat of Owls  Andrew Bodling - AFRL Anupam Sharma - ISU	44DCASS-158 Time-Accurate Evaluation of Film Cooling Jet Characteristics for Plenum and Crossflow Coolant Supplies  Spencer Sperling - OSU	44DCASS-177 Near-Field Measurements of a Low Aspect Ratio Supersonic Nozzle Interacting with a Surface  Florian Baier - UC Aatresh Karnam - UC Dr. Ephraim Gutmark - UC	44DCASS-036 Experimental Investigation of Flow Characteristics in An Ultra Compact Combustor  Tylor Rathsack - AFIT Marc D. Polanka - AFIT Brian T. Bohan - AFIT Larry P. Goss - ISSI	44DCASS-092 Steps Towards Automatic Test Generation for Testing Autonomous Operations of a Mars-Rover Using ROS  Sailendra Karra - UC Dr. Catharine McGhan - UC	<p>Please join us in the</p> <p><b>Frederick C. Smith Auditorium (Room 150)</b></p> <p>for the</p> <p><b>AFIT CENTENNIAL SYMPOSIUM!</b></p> <p>For a detailed schedule of events, please refer to page 4.</p>	3:10 PM
44DCASS-093 Introduction of Sound Waves in Intrapulmonary Percussive Ventillation  Aaron Wheeler - UC Vijay Anand - UC Alexander Zahn - UC Ephraim Gutmark - UC	44DCASS-173 Unsteady Aerodynamics of Blended Fan Blades Abstract  Clint Knapke - WSU Dr. Mitch Wolff - WSU Dr. David Johnston - AFRL	44DCASS-127 Deterministic Mechanical Properties of Designing Miscellaneous Lattice Cell Structures Using Kriging Model  Tahseen AL-wattar - WSU Dr-Ahsan Mian - WSU	44DCASS-094 Laser Based EKF Localization on TurtleBot3 Robot  Oyindamola Omotuyi - UC James Wells - UC Aditya Deshpande - UC Rumit Kumar - UC Manish Kumar - UC	44DCASS-078 Recurrent Neural Networks Applied to Surgical Path Planning for Semi-Autonomous Robotic Surgery in Remote Environments  Christopher Korte - UC Catharine McGhan - UC		3:30 PM
44DCASS-023 Acoustics of Cold Supersonic Rectangular Jet - Near Field Analysis  Aatresh Karnam - UC Florian Baier - UC Ephraim Gutmark - UC	44DCASS-128 Development of Improved Loss Models for a Compressor Throughflow Design Code Using CFD Data  Troy Lanchman - WSU Michael List - AFRL Mitch Wolff - WSU	44DCASS-064 Development of a sensor frame harness gait assessment device for occupational health in nursing  Amanda Miller - UC Dr. Manish Kumar - UC Dr. Tamara Lorenz - UC	44DCASS-012 Investigation of Scaled Down Doppler Lidar for Velocity Measurements in Wind Tunnels  Samuel Barnhart - UD Sidaard Gunasekaran - UD	44DCASS-109 A Comparison on Different Affordable Approaches for Robotics Simulation and Testing using Virtual Reality  Zhenyu Shi - UC Dr. Catharine McGhan - UC		3:50 PM
44DCASS-146 On the Dynamics and Acoustics of a Hot Overexpanded Rectangular Jet  Suryapratim Chakrabarti - OSU Cory Stack - OSU S. Unnikrishnan - OSU D. V. Gaitonde - OSU	44DCASS-045 Periodic Forcing of an Endwall Vortex in a Low Pressure Turbine Passage  Molly Donovan - WSU Dr. Mitch Wolff - WSU Dr. Christopher R. Marks - AFRL Dr. Rolf Sondergaard - AFRL	44DCASS-103 An Affordable Helmholtz Cage Design for 1U and 3U CubeSat Testing  Matthew Verbryke - UC Jason Roll - UC Catharine McGhan - UC Ou Ma - UC	44DCASS-148 Processing Infrared Images of Rotating Gas Turbine Blades  Louis Christensen - OSU Randall Mathison - OSU	44DCASS-125 Sheet Velocity Measurements Using Laser Absorption Spectroscopy in a Xenon Hall Effect Thruster  Avery Leonard - AFIT		4:10 PM
Adjourn						4:30 PM

MU = Miami University  
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OSU = The Ohio State University  
SBU = Stony Brook University

SE = Spectral Energies LLC  
SLU = St. Louis University  
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UKY = University of Kentucky

UT = University of Texas  
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<b>Registration</b>	Dr. Tim Leger	Dr. Nitin Bhagat
<b>Venue/Gift</b>	Ms. Beth Huelskamp	Dr. Markus Rumpfkeil
<b>Keynote</b>	Dr. James Rutledge	Dr. Steve Cain
<b>Session Chair Coordinator</b>	Dr. Brian Bohan	
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### Contact

Mr. Jeffrey Hetzel  
Dr. Marc Polanka  
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Dr. Sidaard Gunasekaran  
Dr. Alexandre Martin  
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Dr. Robert Setlock  
Dr. Timothy Reissman  
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Dr. Robyn L. Bradford-Vialva  
Dr. David Gallagher  
Dr. Erick Vasquez  
Dr. Jamie Gengler  
Dr. Roland Watts  
Dr. Donald Kunz  
Dr. Lyle Lockwood

### Email

[jeffrey.hetzel@us.af.mil](mailto:jeffrey.hetzel@us.af.mil)  
[Marc.Polanka@afit.edu](mailto:Marc.Polanka@afit.edu)  
[j-marquart@onu.edu](mailto:j-marquart@onu.edu)  
[jhemi.1@osu.edu](mailto:jhemi.1@osu.edu)  
[blackgr@ucmail.uc.edu](mailto:blackgr@ucmail.uc.edu)  
[gunasekarans1@udayton.edu](mailto:gunasekarans1@udayton.edu)  
[alexander.martin@uky.edu](mailto:alexander.martin@uky.edu)  
[rory.roberts@wright.edu](mailto:rory.roberts@wright.edu)  
[KaiJames@illinois.edu](mailto:KaiJames@illinois.edu)  
[vankurjt@muohio.edu](mailto:vankurjt@muohio.edu)  
[chair@asmedayton.org](mailto:chair@asmedayton.org)  
[dholland@cedarville.edu](mailto:dholland@cedarville.edu)  
[setlocrj@muohio.edu](mailto:setlocrj@muohio.edu)  
[treissman1@udayton.edu](mailto:treissman1@udayton.edu)  
[joy.gockel@wright.edu](mailto:joy.gockel@wright.edu)  
[scogrig@gmail.com](mailto:scogrig@gmail.com)  
[chair@midwestsampe.org](mailto:chair@midwestsampe.org)  
[david.gallagher@dot.ohio.gov](mailto:david.gallagher@dot.ohio.gov)  
[chair@daytonacs.org](mailto:chair@daytonacs.org)  
[jamie.gengler.ctr@wpafb.af.mil](mailto:jamie.gengler.ctr@wpafb.af.mil)  
[rolandjw@zoomtown.com](mailto:rolandjw@zoomtown.com)  
[Donald.Kunz@afit.edu](mailto:Donald.Kunz@afit.edu)  
[llockwood@utcdayton.com](mailto:llockwood@utcdayton.com)



**AIAA**  
Dayton-Cincinnati Section

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://engage.aiaa.org/Dayton-Cincinnati/home> and volunteer to lead or help with any of these positions, or any of the others listed on the website:

Section Chairs	Jeff Hetzel	AFLCMC	937-255-1862	The buck stops here for the execution of all section activities!
Vice Chair	Troy Hoeger	Odyssey Systems		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.





**AIAA**  
Dayton-Cincinnati Section

**AMERICAN INSTITUTE OF  
AERONAUTICS AND ASTRONAUTICS  
DAYTON-CINCINNATI SECTION**

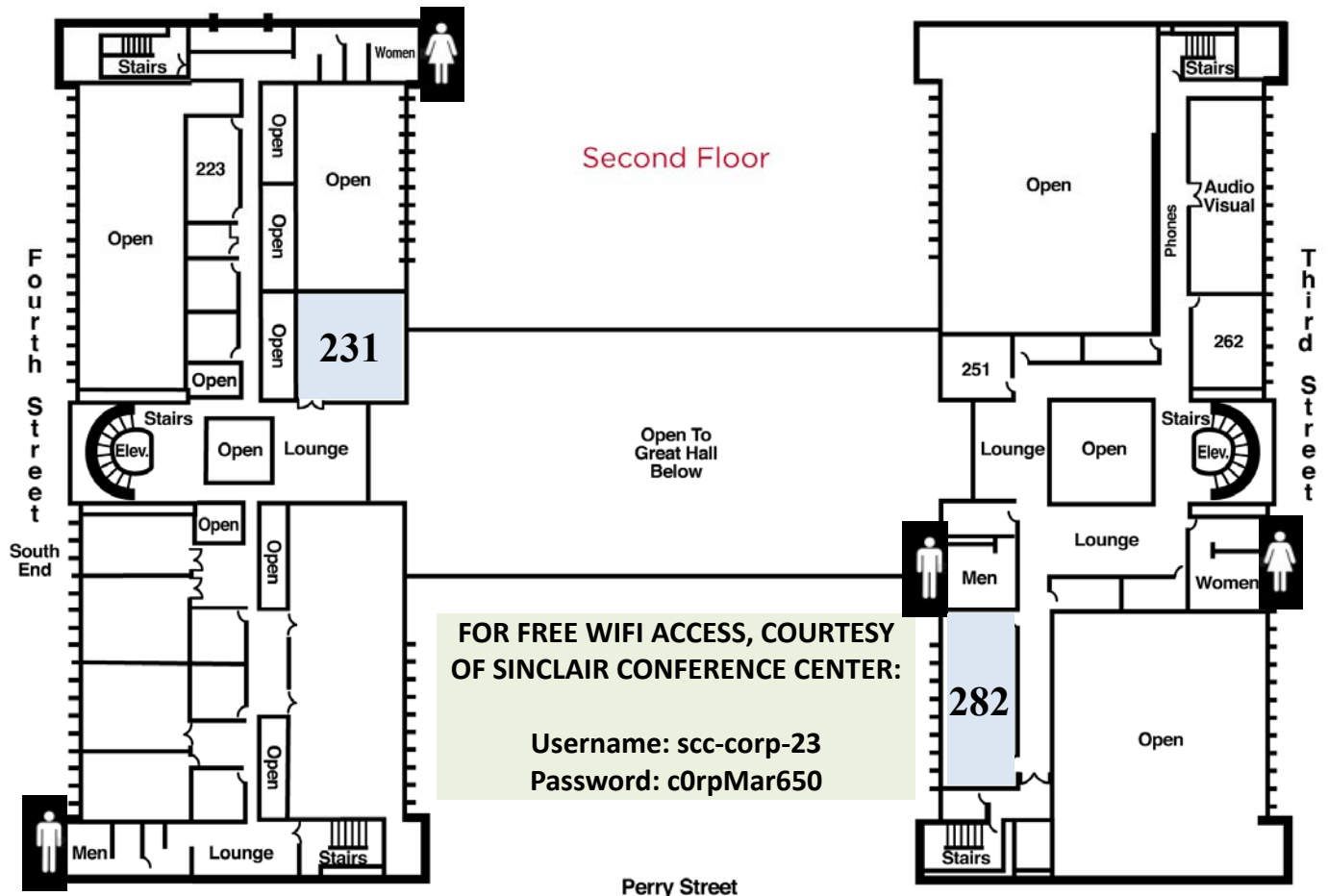
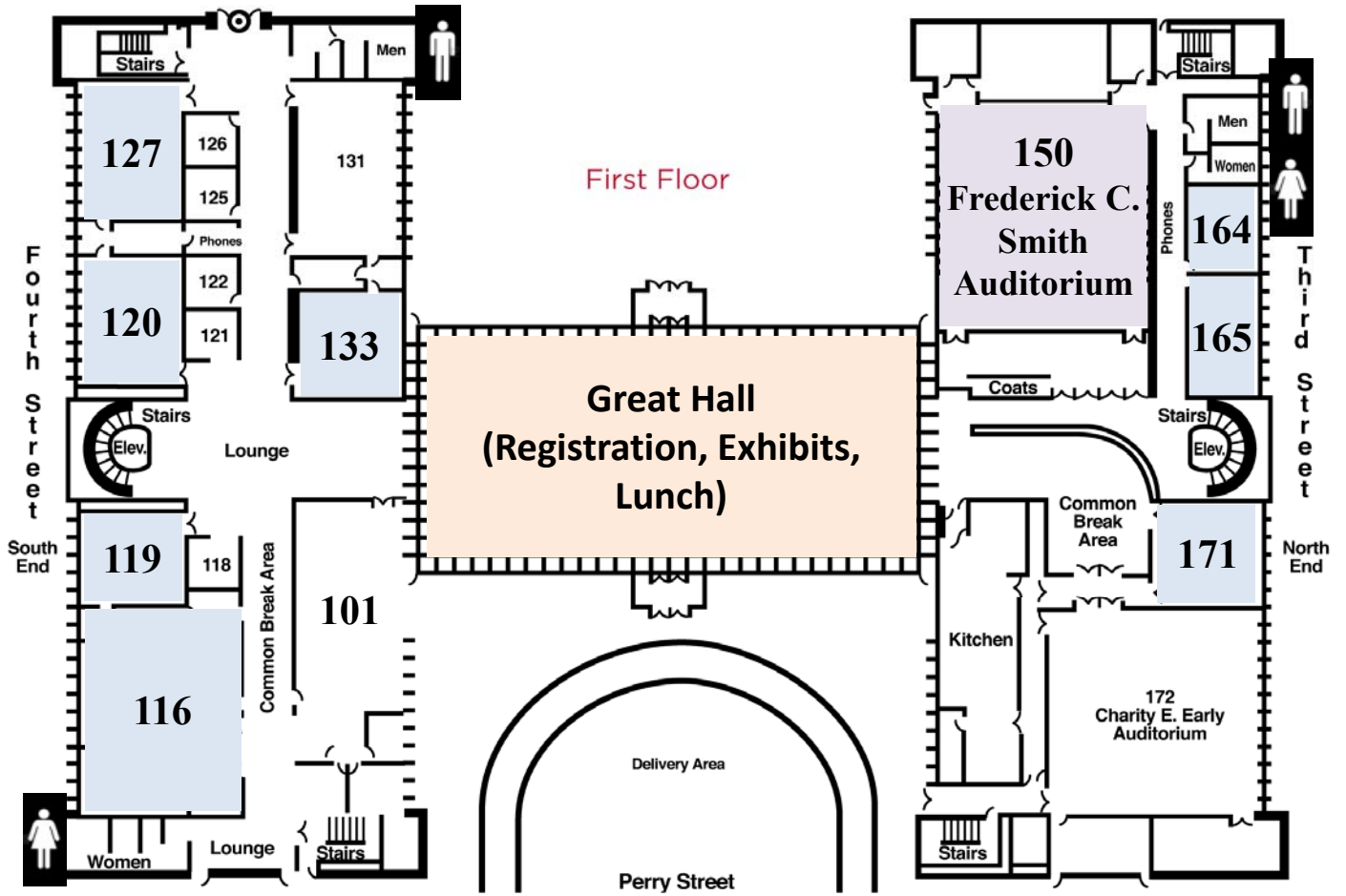
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Honors/Awards Chair	Marc Polanka	AFIT/ENY	937-255-3636 x4714	Run the section awards program, promote national award opportunities within the section, and plan the year-end awards banquet.
Public Policy Chair	Oliver Leembruggen	Sumaria Systems	937-656-8502	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	Jose Camberos	AFRL	937-713-7055	Advocate the aerospace profession to youth by organizing innovative education activities in the name of AIAA.
College Outreach	Ashlee Youngpeters	Pratt & Whitney		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 Mitchell	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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# Dayton-Cincinnati Aerospace Sciences Symposium

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**AIAA**  
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*Corporate Exhibitions*  
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**An opportunity for companies to informally discuss options with the brightest local students from numerous local and regional Universities.**

*An excellent forum for students to learn about career options and collaborative opportunities in the Dayton - Cincinnati region. For additional information see our website at <http://www.aiaa-daycin.org/>*