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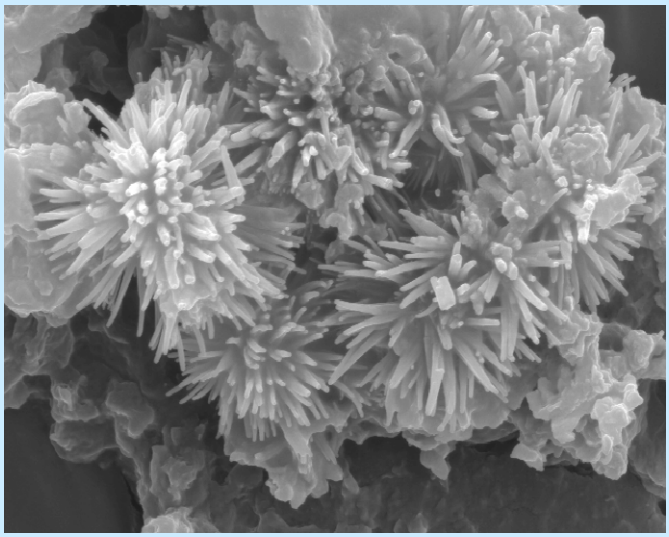
SYMPOSIUM GUIDE

The Thirty-Eighth Annual

Dayton-Cincinnati Aerospace Sciences Symposium



Winning image from 2012 Art-In-Science competition:
"Polymer Crystals – Sunflower Type"
Submitted by Aniket Vyas and Jude Iroh, University of Cincinnati

6 March 2013
Sinclair Conference Center
Dayton, Ohio

Dayton Section

Ohio Valley Section

Human Factors and Ergonomics Society

Society for the Advancement of Material and Process

Welcome
to the
38th AIAA Dayton-Cincinnati Aerospace Sciences Symposium (DCASS)

- - - - -

This year marks the 50th anniversary of the American Institute of Aeronautics and Astronautics (AIAA). Formed in 1963 through consolidation of the American Rocket Society (ARS) and the Institute of Aerospace Sciences (IAS), AIAA is today the world's largest technical society dedicated to the global aerospace profession. By addressing the professional needs of the local aerospace workforce, DCASS carries on the tradition of aerospace leadership exemplified by AIAA.

Our program this year includes over 150 technical presentations, a panel session on career workforce development, remarks by Dr. Sandra Magnus (Executive Director of the AIAA), and a keynote presentation by Dr. Hans Mark (John J. McKetta Centennial Energy Chair in Engineering at the University of Texas at Austin).

This event has been organized by a group of dedicated volunteers, co-sponsored by several regional professional societies, and supported by corporate and educational sponsors and exhibitors. You can find information on these groups and individuals elsewhere in this program. We thank them for their support.

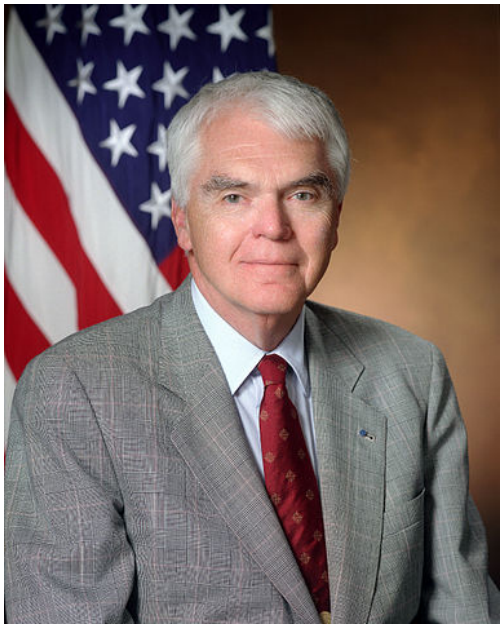
We hope your experience at the Symposium is enjoyable and fruitful, and we look forward to seeing you again next year!

Rich Snyder and Rich Anthony
38th DCASS General Co-Chairs

38th AIAA Dayton-Cincinnati Aerospace Sciences Symposium
March 6, 2013 (11:20a.m. – 12:30p.m.)
Sinclair Conference Center, Dayton, OH
www.aiaa-daycin.org

Dealing With Emerging Threats and Capabilities: An Air Force Challenge

Dr. Hans Mark



Dr. Hans Mark is a former Secretary of the Air Force and a former Deputy Administrator of NASA. He is an expert and consultant in aerospace design and national defense policy. Dr. Mark currently works in the Department of Aerospace Engineering and Engineering Mechanics at the University of Texas at Austin.

Dr. Mark received a bachelor's degree in physics from the University of California, Berkeley in 1951 and a Ph.D. in physics from the Massachusetts Institute of Technology (MIT) in 1954. After completion of his doctorate, he stayed on at MIT as a research associate and acting head of the Neutron Physics Group Laboratory for Nuclear Science. He returned to UC Berkeley in 1955 and remained there until 1958 as a research physicist at the University's Lawrence Radiation Laboratory in Livermore. Dr. Mark then returned to MIT as an assistant professor of physics. In 1960, he again returned to the University of California's Livermore Radiation Laboratory's Experimental Physics Division. He remained there until 1964, when he became chairman of the university's Department of Nuclear Engineering and administrator of the Berkeley Research Reactor.

In February 1969, he became director of NASA's Ames Research Center, located in Mountain View, California. In this role, he managed the center's research and applications efforts in aeronautics, space science, life science and space technology. He subsequently served as Undersecretary of the Air Force from 1977 until July 1979, when he was promoted to Secretary of the Air Force. Concurrently, he served as Director of the National Reconnaissance Office, from August 1977 to October 1979. He remained as this position until 1981, when he was appointed Deputy Administrator of NASA by President Reagan, a position he served in from July 10, 1981 to September 1, 1984.

Upon leaving NASA in 1984, Mark served as Chancellor of The University of Texas system until 1992. He moved on to become a senior professor of aerospace engineering at The University of Texas at Austin. In July 1998, he began work at The Pentagon upon President Clinton's nomination of him as Director of Defense Research and Engineering. In 2001, he returned to The University of Texas at Austin, where he currently holds the John J. McKetta Centennial Energy Chair in Engineering as a professor in the Department of Aerospace Engineering and Engineering Mechanics. He currently teaches a one-hour introductory course to incoming freshman on Aerospace Engineering. All undergraduates since 2001 have taken his course. He also teaches a history of space flight course and as well as a course focusing on the role of technology in the Cold War. Dr. Mark also holds a research position at the University of Texas' Institute for Advanced Technology.

Dr. Hans Mark is a member of the National Academy of Engineering, the nation's highest honor for engineering professionals. He is also an Honorary Fellow of the American Institute of Aeronautics and Astronautics. He received the 1999 Joe J. King Engineering Achievement Award and the 1999 George E. Haddaway Medal for Achievement in Aviation. Dr. Mark was recently honored for his contributions to the US military space program at the 2006 annual meeting of the American Astronautical Society. He received the 2006 Military Astronautics Award on November 14, 2006 at the society’s annual meeting in Pasadena, Calif.

In 2008, the Space Foundation awarded Mark its highest honor, the General James E. Hill Lifetime Space Achievement Award. It is presented annually to recognize outstanding individuals who have distinguished themselves through lifetime contributions to the welfare or betterment of humankind through the exploration, development and use of space, or the use of space technology, information, themes or resources in academic, cultural, industrial or other pursuits of broad benefit to humanity. Dr. Mark has written or edited eight books and published more than 180 technical reports.

38th AIAA Dayton-Cincinnati Aerospace Sciences Symposium
March 6, 2013 (11:20a.m. – 12:30p.m.)
Sinclair Conference Center, Dayton, OH
www.aiaa-daycin.org

Remarks from the AIAA Executive Director

Dr. Sandra Magnus

Dr. Magnus is the Executive Director of the American Institute of Aeronautics and Astronautics (AIAA). The AIAA is the world's largest technical society dedicated to the global aerospace profession. With more than 35,000 individual members worldwide, and nearly 100 corporate members, the AIAA brings together industry, academia, and government to advance engineering and science in aviation, space, and defense.

Born and raised in Belleville, Illinois, Dr. Magnus graduated from the University of Missouri-Rolla in 1986 with a degree in physics and in 1990 with a master's degree in electrical engineering. She received a Ph.D. in materials science and engineering from Georgia Tech in 1996.

Dr. Magnus worked at McDonnell Douglas Aircraft on military aircraft programs before joining NASA in 1996 to begin training for flight assignment as a mission specialist. She gained much international experience working with the European Space Agency (ESA), with the National Space Development Agency of Japan (NASDA), and with Brazil on facility-type payloads. She also traveled to Russia in support of testing and product development.

Dr. Magnus flew in space on the STS-112 shuttle mission in October 2002, and on the final shuttle flight, STS-135, in July 2011. In addition, she flew to the International Space Station on STS-126 in November 2008, served as flight engineer and science officer on Expedition 18, and returned home on STS-119 after four and a half months. Following her assignment on Station she served at NASA Headquarters in the Exploration Systems Mission Directorate. Her last duty at NASA, after STS-135, was as the deputy chief of the Astronaut Office.

She has received numerous awards, including the NASA Space Flight Medal, the NASA Distinguished Service Medal, the NASA Exceptional Service Medal, and the 40 at 40 Award (given to former collegiate women athletes to recognize the impact of Title IX).

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 – 5:15 PM

First Block 8:10 AM – 9:30 AM

	Empty	Room 119
1	CFD Applications I	Room 120
2	Imaging and Diagnostics I	Room 127
3	Combustion I	Room 131
4	Computational Applications	Room 133
5	Uncertainty Quantification & Optimization Under Uncertainty	Room 164
6	Acoustics I	Room 165
7	Structures	Room 171
	Empty	Room 231
	Empty	Auditorium 150

Second Block 9:45 AM – 11:05 AM

8	Fluid Dynamics I	Room 119
9	CFD Methods I	Room 120
10	Imaging & Diagnostics II	Room 127
11	Combustion II	Room 131
12	Unmanned Air Vehicles	Room 133
13	Heat Transfer	Room 164
14	Acoustics II	Room 165
15	Fatigue & Fracture	Room 171
16	HIFiRE Aerodynamics & Aerothermodynamics Investigation	Room 231
	Empty	Auditorium 150

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 – 3:20 PM

17	Fluid Dynamics II	Room 119
18	CFD Methods II	Room 120
19	Turbomachinery	Room 127
20	Combustion III	Room 131
21	Power & Thermal Management	Room 133
22	Space I	Room 164
23	Bio Applications	Room 165
24	Materials I	Room 171
25	HIFiRE Flight 6 Free Flier; Guidance & Control Experiment	Room 231
	Empty	Auditorium 150

Fourth Block 3:35 PM – 5:15 PM

26	Fluid Dynamcs III	Room 119
27	CFD Applications II	Room 120
28	Turbomachinery II	Room 127
29	Detonation Propulsion	Room 131
30	Micro Air Vehicles	Room 133
31	Space II	Room 164
32	Optimization	Room 165
33	Materials II	Room 171
34	HIFiRE Flight 5 & 6 Vehicle Development	Room 231
35	Panel Session: Career and Workforce Development	Auditorium 150

The abstracts for the talks presented today may be found on the AIAA Dayton-Cincinnati Section website: www.aiaa-daycin.org. The Executive Committee encourages the use of this website. Just locate the menu for the AIAA Aerospace Sciences Symposium to access the abstracts.

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
Computational Applications	1, 4, 9, 18, 27	Structures and Materials	7, 15, 24, 33
Design and Optimization	5, 32	Fluid Dynamics	8, 17, 23, 26
Propulsion	3, 11, 19, 20, 28, 29	Aerospace Environments	6, 14, 22, 31
Flight Dynamics and Testing	16, 25, 34	Experimental Methods	2, 10
Unmanned and Micro Air Vehicles	12, 30	Thermal Management & Heat Transfer	13, 21

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	150 AUD	119	120	127	131
Time			SESSION 1 **CFD Applications I** Chair: Christopher Martin *AFIT*	SESSION 2 **Imaging and Diagnostics I** Chair: John Hoke *ISSI*	SESSION 3 **Combustion I** Chair: Dave Liu *AFIT*
8:10			*38DCASS-023* A Methodology for 3-D Zero-Lift Drag with Aeroelastic Effects *Ronald Taylor - WSU* *Franklin Eastep - UD* *Raymond Kolonay - AFRL*	*38DCASS-166* 10-kHz fiber–coupled particle-image velocimetry *Naibo Jiang - SE* *Paul S. Hsu - SE* *Sukesh Roy - SE* *James R. Gord - AFRL*	*38DCASS-010* Turbulent Non-premixed Flame Analysis Using an Imaging Fourier-Transform Spectrometer *Jacob Harley - AFIT* *Kevin C. Gross - AFIT*
8:30			*38DCASS-043* Numerical Simulation of spallation phenomena in an arc-jet environment *Raghava Davuluri - UKY* *Dr. Alexandre Martin - UKY*	*38DCASS-126* High-speed planar imaging of turbulent flames using a quasi-continuous burst-mode laser *Joseph Miller - NRC* *James B. Michael - ISU* *Terrence R. Meyer - ISU* *Mikhail N. Slipchenko - SE* *Sukesh Roy - SE* *James R. Gord - AFRL*	*38DCASS-133* Development of a Correlation to Predict Lean Blow-Out of Bluff-Body Stabilized Flames with Consideration of Fuel Effects *Beth Huelskamp - ISSI* *Barry Kiel - AFRL*
8:50			*38DCASS-064* Application of a 2-D Poor Man's Navier--Stokes Equations in Simulation of Injection and Combustion of Scramjet Engines *Rui Fu - UKY* *J. M. McDonough - UKY* *Alexandre Martin - UKY*	*38DCASS-138* Saturation Threshold of Vibrational Femtosecond CARS *Anil Patnaik - ISSI* *Anil K. Patnaik - ISSI* *Sukesh Roy - SE* *James R. Gord - AFRL*	*38DCASS-015* Medium Pressure Emissions of a MultiPoint Low NOx Combustion System *Rodrigo Villalva-Gomez - UC* *Brian Dolan - UC* *David Munday - UC* *Ephraim Gutmark - UC* *Gregory Zink - UTCAS* *Spencer Pack - UTCAS* *Jerry Goeke - UTCAS*
9:10			*38DCASS-100* Numerical Investigation of the HIFiRE-2 Flowpath *Robert Yentsch - OSU* *Datta V. Gaitonde - OSU*	*38DCASS-157* Direct measurements of collisionally broadened Raman linewidths of CO2 S-branch transitions *Hans Stauffer - SE* *Sukesh Roy - SE* *Paul S. Hsu - SE* *Naibo Jiang - SE* *Joseph R. Gord - PU* *Waruna D. Kulatilaka - SE* *James R. Gord - AFRL*	*38DCASS-058* Flame Propagation Enhancement of Ethylene by Addition of Ozone *Matthew Pinchak - UC* *Timothy Ombrello - AFRL* *Campbell Carter - AFRL* *Ephraim Gutmark - UC* *Viswanath Katta - ISSI*
9:30	Break				

AFFILIATION ABBREVIATIONS USED IN THE TECHNICAL PROGRAM:

ABDA - Aerospace Business Development Associates Inc.
AFIT - Air Force Institute of Technology
AFRL - Air Force Research Laboratory
BU - Bellarmine University
GE - General Electric Aviation
GHI - GoHypersonic Inc.
HTT - Honeywell Turbo Technologies
ISSI - Innovative Scientific Solutions Inc.
ISU - Iowa State University
MLPC - Mound Laser & Photonics Center Inc.
NKU - Northern Kentucky University
NRC - National Research Council
NRL - Naval Research Laboratory
NTM - NexTech Materials
OAI - Ohio Aerospace Institute
OSU - The Ohio State University
PIAD - Petroleum Institute Abu Dhabi
PU - Purdue University

38th Dayton-Cincinnati Aerospace Sciences Symposium

133	164	165	171	231	Room
SESSION 4 **Computational Applications** Chair: Edward Alyanak *AFRL*	SESSION 5 **Uncertainty Quantification and Optimization Under Uncertainty** Chair: Jose Camberos *AFRL*	SESSION 6 **Acoustics I** Chair: Ramana Grandhi *WSU*	SESSION 7 **Structures** Chair: Frank Eastep *AFRL*		Time
38DCASS-164 Flight Dynamics System Identification of a Free Falling Ballute *Emily Henry - WSU* *Dr. Joseph Slater - WSU*	*38DCASS-032* Advanced Mathematical Techniques for New Systems-level Analysis and Optimization *Jose Camberos - AFRL* *John H. Doty - UD*	*38DCASS-016* Acoustic Analysis and Optimization of Embedded Exhaust-Washed Structures *Ryan Vogel - WSU* *Dr. Ramana Grandhi - WSU*	*38DCASS-079* Design of a Lighter Than Air Vehicle that Achieves Positive Buoyancy Using a Vacuum *Trent Metlen - AFIT* *Distinguished Professor Anthony Palazotto - AFIT*		8:10
38DCASS-071 Fuzzy PID Control System for a Pitch Attitude Hold System in a Fighter Jet *Amanda McGee - UC* *Kelly Cohen - UC*	*38DCASS-096* Effectiveness of Different Model Form Quantification Techniques *Christopher Fischer - WSU* *C. Corey Fischer - WSU* *Ramana V. Grandhi - WSU*	*38DCASS-069* Measuring the acoustic Impedance and Suppression of four acoustic modes using a versatile 2” x 2” wave tube *Vaughn Bostwick - UC*	*38DCASS-132* Stress Wave propagation in a bar *Armando DeLeon - AFIT* *Dr. Anthony N. Palazotto - AFIT*		8:30
38DCASS-028 Computational fluid dynamics models of turbulence in urban settings *Keyu Chen - UKY* *J. M. McDonough - UKY*	*38DCASS-001* Optimization Under Mixed Aleatory/Epistemic Uncertainty *Markus Rumpfkeil - UD*	*38DCASS-075* The Measurement Technique for the First Circumferential Acoustic Mode in a Circular Duct *Eric Wesseling - UC* *Jeremy J. Dunbar - UC* *Asif A. Syed - UC*	*38DCASS-148* Predicting the Wear of High Speed Rocket Sleds *Lauren Wuertemberger - AFIT* *Dr. Anthony Palazotto, Distinguished Professor - AFIT*		8:50
38DCASS-165 Safety Nets: Why do we still program like tightrope walkers without safety nets? *Michael List - UC*	*38DCASS-102* Importance Sampling Uncertainty Quantification for Particle Simulation of a Hypersonic Shock Interaction Flow *Jonathan Burt - AFRL* *Eswar Josyula - AFRL*	*38DCASS-160* Experimental Investigation of Installation Effects for Commercial Aircraft Including Pylon/Wing/Flap Interaction with Engine Exhaust. *Michael Perrino - UC* *Dr. Ephraim Gutmark - UC*	*38DCASS-088* Designer Materials for Controlling Thermally and Aerodynamically Excited Viscoelastic Lifting Surface Flutter and Structural Failures *Harry Hilton - UIUC*		9:10
Break					9:30

SE - Spectral Energies LLC
SOCHE - Southwestern Ohio Council for Higher Education
TAMU - Texas A&M University
UC - University of Cincinnati
UCF - University of Central Florida
UD - University of Dayton
UDRI - University of Dayton Research Institute
UES - UES Inc.
UIUC - University of Illinois at Urbana-Champaign
UKY - University of Kentucky
UTC - Universal Technology Corp.
UTCAS - UTC Aerospace Systems
VT - Virginia Tech
WBI - Wright Brothers Institute
WSU - Wright State University
WVU - West Virginia University

Room	150 AUD	119	120	127	131
Time		SESSION 8 **Fluid Dynamics I** Chair: Aaron Altman *UD*	SESSION 9 **CFD Methods I** Chair: Don Rizzeta *AFRL*	SESSION 10 **Imaging & Diagnostics II** Chair: Oliver Leembruggen *AFRL*	SESSION 11 **Combustion II** Chair: Paul Litke *AFRL*
9:45		*38DCASS-052* Identification of Aircraft by their Unique Turbulent Wake Signature: Progress with Experimental Validation *Sidaard Gunasekaran - UD* *Aaron Altman - UD*	*38DCASS-049* An Implicit Harmonic Balance Method with a Discontinuous Galerkin Spatial Scheme *Robert Knapke - UC* *Marshall Galbraith - UC* *Mark Turner - UC* *Paul Orkwis - UC*	*38DCASS-115* Spectral Focusing for Interference-free Coherence Dynamics of Gas-phase Molecules *Paul Wrzesinski - NRC* *Sukesh Roy - SE* *James R. Gord - AFRL*	*38DCASS-158* Effect of Pulsed, Sub-breakdown Applied Electric Field on Propane/Air Flame through Simultaneous OH/Acetone PLIF *Jacob Schmidt - SE* *Naibo Jiang - SE* *Sukesh Roy - SE* *James Gord - AFRL* *Biswa Ganguly - AFRL*
10:05		*38DCASS-051* Correction to Classical Lift Curve Slope at Low-Reynolds Number *Kevin Wabick - UD* *Kevin Wabick - UD* *Aaron Altman - UD* *Kenneth Granlund - AFRL* *Michael OL - AFRL*	*38DCASS-024* A Discontinuous Galerkin Chimera Scheme with Implicit Artificial Boundaries *Marshall Galbraith - UC* *Robert D. Knapke - UC* *Paul D. Orkwis - UC* *John A. Benek - AFRL*	*38DCASS-128* Ultrahigh-Frame-Rate Imaging of Turbulent Mixing Using Femtosecond Planar Laser-Induced Fluorescence (fs-PLIF) of Nitric Oxide *Waruna Kulatilaka - SE* *Naibo Jiang - SE* *Sukesh Roy - SE* *James Gord - AFRL*	*38DCASS-085* Application of an Imaging Fourier-Transform Spectrometer to Determine Two-Dimensional Scalar Values in Laminar Flames *Michael Rhoby - AFIT* *Kevin C Gross - AFIT* *David L Blunck - AFRL*
10:25		*38DCASS-159* Mass Transport from a Trapped Vortex Combustor *Daniel Richardson - NRC* *Alejandro Briones - UDRI* *David Blunck - AFRL*	*38DCASS-036* Comparison between filtering methods for large-eddy simulation *Weiyun Liu - UKY* *J. M. McDonough - UKY*	*38DCASS-149* Fiber-coupled pulsed-laser diagnostics for simultaneous species-concentration and velocity measurements in practical combustors *Paul Hsu - SE* *Sukesh Roy - SE* *Naibo Jiang - SE* *Anil. Patnaik - ISSI* *James R. Gord - AFRL*	*38DCASS-060* Image Post-Processing Methods for the Visualization of Global Flame Dynamics *Brian Dolan - UC* *Rodrigo Villalva - UC* *David Munday - UC* *Ephraim Gutmark - UC* *Gregory Zink - UTCAS* *Spencer Pack - UTCAS* *Jerry Goeke - UTCAS*
10:45		*38DCASS-050* Stereoscopic PIV in a coaxial piping system *Yuri Perelstein - UC* *David Munday - UC* *Ephraim Gutmark - UC*	*38DCASS-163* Discontinuous Galerkin Scheme Applied to Chimera Overset Viscous Meshes on Curved Geometries *Marshall Galbraith - UC* *Paul D. Orkwis - UC* *John A. Benek - AFRL*	*38DCASS-155* High-Speed PIV and OH PLIF Measurements in Bluff-Body Stabilized Flames *Andrew Caswell - SE* *Naibo Jiang - SE* *Sukesh Roy - SE* *James R. Gord - AFRL*	*38DCASS-084* The poor man's Navier--Stokes equation with hydrogen-oxygen fi□nite-rate chemistry *Wenwei Zeng - UKY* *J. M. McDonough - UKY*
11:05	Break				
11:20	Room 150 - Frederick Smith Auditorium **Welcome & Announcements** Dr. Rich Snyder, *38th DCASS General Chair* **Opening Remarks** Dr. Sandra Magnus, *AIAA Executive Director*				
12:30	Lunch				

133	164	165	171	231	Room
SESSION 12 **Unmanned Air Vehicles** Chair: Richard Cobb *AFIT*	SESSION 13 **Heat Transfer** Chair: Paul Kreitzer *AFRL*	SESSION 14 **Acoustics II** Chair: Scott Sherer *AFRL*	SESSION 15 **Fatigue & Fracture** Chair: Alan Jennings *AFIT*	SESSION 16 **HIFiRE Aerodynamics & Aerothermodynamics Investigation** Chair: Douglas Dolvin *AFRL*	Time
38DCASS-098 Portable UAV Launch System *Kevin Davis - UC* *Kevin Davis - UC* *Dr. Kelly Cohen - UC*	*38DCASS-039* Analysis of a Wing Fuel Tank Energy Model to Determine Heat Sink Possibilities *Jason Roland - UD* *Markus Rumpfkeil - UD*	*38DCASS-057* Effect of Scale on the Far-Field High-Order Statistics of Heated Supersonic Jets *Pablo Mora - UC* *Nick Heeb - UC* *Jeff Kastner - UC* *Ephraim Gutmark - UC* *K. Kailasanath - NRL*	*38DCASS-045* Influence of reverse plasticity in residual stress prediction of laser peened components with curved geometries *Anoop Vasu - WSU* *Ramana V. Grandhi - WSU*	*38DCASS-103* Hypersonic International Flight Research and Experimentation: Fundamental Sciences and Development Strategy *Douglas Dolvin - AFRL*	9:45
38DCASS-127 Temperature Control Algorithm for Fire Fighting UAV *John Hasselbeck - UC* *Kelly Cohen - UC*	*38DCASS-130* The Evaluation of Melt Wear due to High Speed Traveling Sled *Kathleen Le - AFIT* *Dr. Anthony Palazotto - AFIT* *Dr. William Baker - AFIT*	*38DCASS-030* Progress in Supersonic Jet Noise Reduction with Fluidic Injection *Daniel Cuppoletti - UC* *Ephraim Gutmark - UC*	*38DCASS-083* Improving Spectral Signature Profiles for Fatigue Crack Identification in Beams *Phillip Cooley - WSU* *Joseph C. Slater - WSU* *Oleg V. Shiryayev - PIAD*	*38DCASS-007* HIFiRE-1 Flight Data Analysis of the Laminar-Turbulent Transition Experiment During Reentry *Scott Stanfield - SE* *Roger L. Kimmel - AFRL* *David Adamczak - AFRL*	10:05
38DCASS-147 Experimental Validation of Task Allocation Algorithms on Multiple UAV Platforms *Timothy Arnett - UC* *Dr. Chelsea Sabo - UC* *Dr. Kelly Cohen - UC*	*38DCASS-161* Verification and Validation of a Transient Heat Exchanger Model *Jayme Carper - WSU* *Dr. Rory Roberts - WSU*	*38DCASS-105* Study of the effects of steady fluidic injection on supersonic jet noise components *Bhupatindra Malla - UC* *Daniel Cuppoletti - UC* *Ephraim Gutmark - UC*	*38DCASS-101* 3D Finite Element Modeling of High-Speed Sliding Wear *Rodolfo Buentello Hernandez - AFIT* *Dr. Anthony Palazotto - AFIT* *Capt. Katheleen Lee - AFIT*	*38DCASS-176* Overview of HIFEX Vehicle Conceptual Design and Wind Tunnel Test Entry Plans *Andrew Dwenger - GHI* *Lance Jacobsen - GHI* *Kevin Park - GHI* *Alyson Turri - AFRL* *Heidi Wilkin - AFRL*	10:25
38DCASS-135 Foundational Construction of High Flying High Speed ISR Trade Space *Dillon Stenger - UD* *Jake Stork - UC* *Ryan Helbach - AFRL*	*38DCASS-081* Experiments used to improve Monte-Carlo Simulation Spray Cooling Model *Jon Stephen Taylor - WVU* *John M. Kuhlman - WVU*	*38DCASS-072* Investigation of Chevron Parameters for Supersonic Jet Noise Reduction *Nicholas Heeb - UC* *E. Gutmark - UC* *K. Kailasanath - NRL*	*38DCASS-134* Using Hysteretic Energy to Evaluate Damping Properties of Hard Coatings on Titanium *Colin Engebretsen - AFIT* *Dr. Anthony Palazotto -AFIT* *Dr. Onome Scott-Emuakpor - AFRL*	*38DCASS-136* Analyzing Optical Data from HIFiRE Flight 2 Ground Tests *Michael Brown - AFRL* *Mark Gruber - AFRL*	10:45
Break					11:05
Room 150 - Frederick Smith Auditorium **Keynote Address:** **Dealing with Emerging Threats and Capabilities: An Air Force Challenge** Dr. Hans Mark, *University of Texas at Austin*					11:20
Lunch					12:30

Room	150 AUD	119	120	127	131
Time		SESSION 17 **Fluid Dynamics II** Chair: Kenneth Granlund *AFRL*	SESSION 18 **CFD Methods II** Chair: Markus Rumpfkeil *UD*	SESSION 19 **Turbomachinery I** Chair: Michael List *AFRL*	SESSION 20 **Combustion III** Chair: David Munday *UC*
13:40		*38DCASS-162* Further Development of Force Field Parameters to Generate Equilibrium Turbulent Boundary Layer *Mbu Waindim - OSU* *Nathan J. Mullenix - OSU* *Datta V. Gaitonde - OSU*	*38DCASS-013* A Multivariate Interpolation and Regression Enhanced Kriging Surrogate Model *Komahan Boopathy - UD* *Markus Rumpfkeil - UD*	*38DCASS-017* Experimental Evaluation of a Transonic Research Compressor *Geofrey Cox - AFIT* *Dr. Anthony Palazotto - AFIT*	*38DCASS-041* AFIT Full Annulus UCC Test Rig Design and Characterization *Jacob Wilson - AFIT* *Dr. Marc Polanka - AFIT*
14:00		*38DCASS-070* Analysis of a Variable Camber Wing during Highly Unsteady Maneuvers *Aaron Altman - UD* *Zachary Lego - UD*	*38DCASS-012* Numerical Methods for Application of Turbulent Basis Functions *Douglas Davis -*	*38DCASS-046* Ported Shroud Effect on a Turbocharger Compressor *Matthieu Gancedo - UC* *Charles Farbos de Luzan - UC* *Dr Ephraim Gutmark - UC* *Dr Erwann Guillou - HTT*	*38DCASS-037* Integration Issues of a Inter-Turbine Burner to a Jet Turbine Engine *Matthew Conrad - AFIT* *Jacob D Wilson - AFIT* *Dr. Marc D Polanka - AFIT*
14:20		*38DCASS-044* Computational Study of Sprays for the Development of a Monte Carlo Model *Murat Dinc - WVU* *Donald D. Gray - WVU*	*38DCASS-021* Initial Implementation and Validation of a Modified Nonequilibrium Wilcox k omega Turbulence Model *Thomas Kudla - UD* *Markus Rumpfkeil - UD*	*38DCASS-121* Automated Optimization of a Compressor Blade Row *Jacob Holden - UC* *Mark G. Turner - UC*	*38DCASS-099* Calculations of Swirling Flow Through a Diffuser, with Applications to an Ultra-Compact Combustor *Rebecca Howard - UTC*
14:40		*38DCASS-067* Characterization of Sprays Impinging onto an Unheated Surface for Spray Cooling Applications *Nicholas Hillen - WVU* *John M. Kuhlman - WVU*	*38DCASS-114* Using Design of Experiments for Applied Computational Fluid Dynamics *Timothy Cleaver - AFIT* *Alex J. Gutman - AFIT* *Raymond R. Hill - AFIT* *Mark F. Reeder - AFIT* *Christopher L. Martin - AFIT*	*38DCASS-141* The Influence of Radial Forces on Wind Turbines to the Axial Induction Factor *Kedharnath Sairam -UC* *Dr. Mark G. Turner - UC*	*38DCASS-170* Experiments with a Well-Stirred Reactor at Simulated Sub-Atmospheric Conditions *Justin Gross - UDRI* *Scott Stouffer - UDRI* *David Blunck - AFRL* *Craig Neuroth - AFRL*
15:00		*38DCASS-002* Plasma Flow Control Simulations of a Low-Reynolds Number Low-Aspect-Ratio Wing *Donald Rizzetta - AFRL* *Miguel Visbal - AFRL*	*38DCASS-026* Exploration of a general relationship between porosity and permeability *Tingting Tang - UKY* *James M. McDonough - UKY*	*38DCASS-146* Time-dependent Shroud Pressure Measurements of a Single-Stage Compressor Near Rotating Stall Inception *Bradley Butler - UKY* *V. R. Capece - UKY*	*38DCASS-009* Effects of Temperature on a Small Internal Combustion Engine *Travis Husaboe - AFIT* *Joshua A. Rittenhouse - AFIT* *Marc D. Polanka - AFIT* *Paul J. Litke - AFRL* *John L. Hoke - ISSI*
15:20	Break				

133	164	165	171	231	Room
SESSION 21 **Power & Thermal Management** Chair: Levi Elston *AFRL*	SESSION 22 **Space I** Chair: Jonathan Black *AFIT*	SESSION 23 **Bio Applications** Chair: Anthony Palazotto *AFIT*	SESSION 24 **Materials I** Chair: James Joo *AFRL*	SESSION 25 **HIFiRE Flight 6 Free Flier; Guidance & Control Experiment** Chair: Joshua Stultz *AFRL*	Time
38DCASS-029 Three-dimensional Modeling of Charring Ablator Materials *Haoyue Weng - UKY* *Alexandre Martin - UKY*	*38DCASS-109* The Prospect of Operationally Responsive Space Using Atmospheric Skip Entry Maneuvers *Robert Bettinger - AFIT* *Dr. Jonathan T. Black -AFIT* *Lt Col Ronald J. Simmons, Ph.D - AFIT*	*38DCASS-033* Fluid structure interaction analysis of patient-specific human upper airway *Jie Chen - UC* *Ephraim Gutmark - UC*	*38DCASS-151* Synthesis of Silver Nanoparticles on Graphene Oxide for Conductive Ink Applications *Zongwu Bai - UDRI* *Gyaneshwar P. Tandon - UDRI* *Brandon J. Yocum - WSU* *Ryan S. Justice - AFRL* *Jeffery W. Baur - AFRL*	*38DCASS-172* Design Evolution of the HIFiRE Flight 6 Free Flyer *Lance Jacobsen - GHI* *Kevin Park - GHI* *Andrew Dwenger - GHI* *Zach Gaston - GHI*	13:40
38DCASS-040 An Experimental Study on the Control of Tip Vortices by Modification of the Tip Shape of Wind Turbine Blade *Zhe Ning - WSU* *Zifeng Yang - WSU*	*38DCASS-131* Non-Deterministic Tracking of Optimal Control Solutions *Jonathan Wright - AFIT* *Eric Swenson - AFIT*	*38DCASS-073* Novel microindenter design for elasticity measurements of vocal fold tissue *Douglas Dembinski - UC* *Liran Oren, PhD - UC* *Ephraim Gutmark, PhD - UC* *Sid Khosla, MD - UC*	*38DCASS-154* Analysis of Sub-Melt Thermal Behavior and Solid State Phase Transformations in Beam-Based Additive Manufacturing of Ti-6Al-4V *Heather Doak - WSU* *Dr. Nathan W. Klingbeil - WSU*	*38DCASS-175* HF6 Free Flyer Cold Structure Design and Analysis *Andrew Dwenger - GHI* *Zach Gaston - GHI* *Lance Jacobsen - GHI* *Kevin Park - GHI*	14:00
38DCASS-047 Development of a reduced model of homogeneous kinetic reactions for the decomposition of phenol *Ali Omidy - UKY* *Alexandre Martin - UKY*	*38DCASS-140* Design Methodology for Control Moment Gyroscope Attitude Actuation Systems for Spacecraft Simulators *Samuel Johnson - AFIT* *Eric Swenson - AFIT*	*38DCASS-063* Designing an image processing tool to measure the opening area of the vocal folds *John Cha - UC* *Liran Oren, PhD - UC* *Ephraim Gutmark, PhD - UC* *Jun Ying, PhD - UC* *Sid Khosla, MD - UC*	*38DCASS-156* Toward Integrated Control of Melt Pool Geometry and Microstructure in Beam-Based Additive Manufacturing of IN 718 *John Thompson - WSU* *Nathan Klingbeil - WSU*	*38DCASS-174* Hot Structure and Interface Design for HIFiRE Flight 6 Free Flyer *Zachary Gaston - GHI* *Lance Jacobsen - GHI* *Andrew Dwenger - GHI* *Kevin Park - GHI*	14:20
38DCASS-168 Generic Aircraft Thermal Tip-to-Tail Modeling and Simulation *Daniel Decker - WSU* *Dr. Rory A. Roberts - WSU* *Scott M. Eastbourn - WSU* *David Woodburn - UCF* *Peter Weise - VT*	*38DCASS-142* Adapting Management Practices to Space-Based Operations *Mike Ryan - BU*	*38DCASS-077* FSI simulations in Human Respiratory Tract Model *Goutham Mylavarapu - UC* *Ephraim Gutmark - UC*	*38DCASS-167* Graphene plasmonics *Joshua Myers - AFRL* *Shin Mou - AFRL* *Don Abeysinghe - AFRL* *Gail Brown - AFRL* *Justin Cleary - AFRL* *Nima Nader - AFRL* *Yan Zhuang - WSU*	*38DCASS-173* HIFiRE Flight 6 Free-Flyer Systems Integration, Packaging, and Interfacing *Kevin Park - GHI* *Andrew Dwenger - GHI* *Zach Gaston - GHI* *Lance Jacobsen - GHI*	14:40
38DCASS-153 Mapping the Design Space of a Supercritical Carbon Dioxide Power Cycle *Andrew Schroder - UC* *Mark Turner - UC*	*38DCASS-143* HARDWARE DESIGN, INTEGRATION, AND TEST FOR THE ALICE CUBESAT MISSION *Christopher Birge - AFIT* *Eric D. Swenson - AFIT*	*38DCASS-078* An Image Processing and Edge Detection Toolbox for Biomedical and Engineering Image Analysis *Dhananjay Subramaniam - UC* *Dr. Ephraim J. Gutmark - UC*	*38DCASS-169* Synthesis, Cure Optimization and Shape-Memory Behavior of Polyaspartimide-Based Resin and Composites *Richard Coomer - SOCHE* *T. Gibson - UDRI* *J. Shumaker - UDRI* *G. P. Tandon - UDRI* *J. Baur - AFRL*	*38DCASS-120* HIFiRE-6 Isogrid Design Process for Stereolithography Mesh Extrusion on Parametric Surfaces *James Tancred - AFRL* *David Adamczak - AFRL* *James Basel - AFIT*	15:00
Break					15:20

Room	150 AUD	119	120	127	131
Time		SESSION 26 **Fluid Dynamics III** Chair: Ryan Schmidt *AFRL*	SESSION 27 **CFD Applications II** Chair: Mark G. Turner *UC*	SESSION 28 **Turbomachinery II** Chair: Marc Polanka *AFIT*	SESSION 29 **Detonation Propulsion** Chair: Waruna Kulatilaka *SE*
15:35	The Aerospace Industry offers many traditional and non-tradition career paths. The panel will discuss some of the many different options available to Aerospace newcomers as well as established professionals. *Doug Bowers - AFRL* *Robert Williams - WBI*	*38DCASS-090* Musings on Vortex Formation and Shedding *Aaron Altman - UD*	*38DCASS-054* CFD investigation of the flow in a coaxial piping system *Charles Farbos de Luzan - UC* *Ephraim Gutmark - UC* *Yuri Perelstein - UC* *David Munday - UC*	*38DCASS-038* Film Cooling Strategies for Fuel Rich Conditions *Jacob Robertson - AFIT* *Marc Polanka - AFIT*	*38DCASS-123* Steady-State Heat Transfer in a Rotating Detonation Engine *Scott Theuerkauf - AFIT* *Paul I. King - AFIT* *Frederick R. Schauer - AFRL* *Richard J. Anthony - AFRL* *John L. Hoke - ISSI*
15:55		*38DCASS-092* Exergy Variation in Wingtip Vortices as a Function of Angle of Attack *Kevin Wabick - UD* *Omar Memon - UD* *Dr. Aaron Altman - UD*	*38DCASS-080* Models of turbulence in sand-dust storm flows *Peiding Wang - UKY* *James M. McDonough - UKY*	*38DCASS-093* Conversion of a Super-scale Linear Turbine Cascade for Cooling Flow Assessment *David Munday - UC* *Brian Dolan - UC* *William Stoddard - UC* *Aaron Carson - UC* *Ephraim Gutmark - UC*	*38DCASS-124* Nozzle Guide Vane Integration into Rotating Detonation Engine *Nick DeBarmore - AFIT* *Paul King - AFIT* *Fred Schauer - AFRL* *John Hoke - ISSI*
16:15	*John Kinney - GE* *John Leland - UDRI*	*38DCASS-091* Rotational and Translational Accelerations of Flat Plates *Kenneth Granlund - AFRL* *Michael OL - AFRL*	*38DCASS-014* Training Maneuver Evaluation for Reduced Order Modeling of Stability & Control Properties Using Computational Fluid Dynamics *Craig Porter - AFIT* *Capt Christopher L Martin - AFIT* *Jedediah H. Butler - AFRL*	*38DCASS-065* Experimental Investigation of Axial Turbine Performance Driven by Steady and Pulsating Flows *Andrew St. George - UC* *Robert Driscoll - UC* *David Munday - UC* *Ephraim Gutmark - UC*	*38DCASS-137* Ignition Design for a Rotating Detonation Engine *Stephen Miller - AFIT* *Paul I King - AFIT* *Frederick R. Schauer - AFRL* *John L. Hoke - ISSI*
16:35	*Larry Dosser - MLPC* *Kellie Chenault - NTM*	*38DCASS-112* Investigation of aspect ratio and dynamic effects due to rotation for a revolving wing using high-fidelity simulation *Daniel Garmann - AFRL* *Miguel Visbal - AFRL* *Paul Orkwis - UC*	*38DCASS-027* Numerical simulation of flapping wing models and exploration of near wall effects *Zhiyong Li - UKY* *J. M. McDonough - UKY*	*38DCASS-011* Effect of Variable Properties within a Reacting Boundary Layer with Film Cooling *Nathan Greiner - AFIT* *Marc D. Polanka - AFIT* *Jacob R. Robertson - AFIT* *James L. Rutledge - AFIT*	*38DCASS-150* Numerical Study of RDE Injection Design *William Stoddard - UC* *Dr. Ephraim J. Gutmark - UC*
16:55		*38DCASS-055* Analysis of Rapidly Pitching Wings using Superposition of Rotational Circulation *Sidaard Gunasekaran - UD* *Aaron Altman - UD*	*38DCASS-062* High-Fidelity Simulations of a Pitching and Plunging Low-Aspect-Ratio Wing *Caleb Barnes - AFRL* *Miguel Visbal - AFRL*	*38DCASS-031* The Influence of Impingement Cooling Unsteadiness on Heat Transfer *Victor Zimmer - WSU* *Chris Knieriem - AFIT* *James L. Rutledge - AFIT* *Shichuan Ou - AFRL*	*38DCASS-059* Experimental Study of Sustained Shock Initiated Detonation in a Multiple Pulse Detonation-Crossover System *Robert Driscoll - UC* *Andrew St. George - UC* *David Munday - UC* *Ephraim J. Gutmark - UC*
17:15	Adjourn				

133	164	165	171	231	Room
SESSION 30 **Micro Air Vehicles** Chair: Mark Reeder *AFIT*	SESSION 31 **Space II** Chair: Eric Swenson *AFIT*	SESSION 32 **Optimization** Chair: Ray Kolonay *AFRL*	SESSION 33 **Materials II** Chair: Carl Tilmann *AFRL*	SESSION 34 **HIFiRE Flight 5 & 6 Vehicle Development** Chair: David Adamczak *AFRL*	Time
38DCASS-104 Power Requirements for Bi-harmonic Amplitude and Bias Modulation Control of a Flapping Wing Micro Air Vehicle *Justin Carl - AFIT* *Garrison J. Lindholm - AFIT* *Richard G. Cobb - AFIT* *Mark F. Reeder - AFIT*	*38DCASS-018* Space Telescope Structural Design Analysis for the Chromotomographic Hyperspectral Imaging Experiment *Kacey Blunck - AFIT* *Eric D. Swenson - AFIT*	*38DCASS-061* Multidisciplinary Optimization of Aircraft Wing in Supersonic Flows *Koorosh Gobal - WSU* *Dr. Ramana V. Grandhi - WSU*	*38DCASS-003* Morphology and Properties of Clay/Nylon-6/Epoxy Nano Composites *Aniket Vyas - UC* *Jude Iroh - UC*	*38DCASS-139* HIFiRE Flight 5 Launch Campaign and Flight *David Adamczak - AFRL* *Roger Kimmel - AFRL*	15:35
38DCASS-076 Rubber Muscle Actuation With Pressurized CO2 From Enzyme-Catalyzed Urea Hydrolysis *Thomas Sutter - UDRI* *Matthew B. Dickerson - UES* *Terry S. Creasy - TAMU* *Ryan S. Justice - AFRL*	*38DCASS-034* The Development and Testing of AFIT's 3U CubeSat *Brian Moore - AFIT* *Dr. Richard Cobb - AFIT*	*38DCASS-087* Stress-based Topology Optimization of Thermal Structures *Joshua Deaton - WSU* *Ramana V. Grandhi - WSU*	*38DCASS-094* Cross-plane thermal properties of transition metal dichalcogenides *Jamie Gengler - SE* *C. Muratore - AFTL* *P.J. Shamberger - AFRL* *A.K. Roy - AFRL* *A.A. Voevodin - AFRL* *V. Varshney - UTC* *J.J. Hu - UDRI* *J.E. Bultman - UDRI* *X. Ruan - PU*	*38DCASS-006* HIFiRE-5 Flight Test Preliminary Results *Thomas Juliano - AFRL* *Roger L. Kimmel - AFRL* *David Adamczak - AFRL*	15:55
38DCASS-108 Validation of a Finite Element Analysis of a Flapping Wing against Inertial and Aeroelastic Responses *Justin Mason - AFIT* *Alan Jennings - AFIT* *Jonathan Black - AFIT*	*38DCASS-042* Optimal Multistatic Initial Orbit Determination Techniques Using Wideband Receivers *Corey Broussard - AFIT* *Dr. Richard Cobb - AFIT*	*38DCASS-074* Optimal Collision Avoidance Trajectories for Unmanned/Remotely Piloted Aircraft *Nathan Smith - AFIT* *Richard G. Cobb - AFIT*	*38DCASS-119* Effect of graphene on the thermomechanical and corrosion inhibition properties of graphene/epoxy ester-siloxane-urea hybrid polymer nanocomposites *Patricia Okafor - UC* *Jude Iroh - UC* *J. Singh-Beemat - UC*	*38DCASS-129* Flight Data Reduction for HIFiRE Flight 5 *James Miller - AFRL* *David W. Adamczak - AFRL* *James A. Tancred - AFRL*	16:15
38DCASS-068 An Experimental Investigation on Wing Optimization for a Flapping Wing MAV *Shih kang Huang - WSU* *George P. Huang - WSU* *Zifeng Yang - WSU*	*38DCASS-066* Responsive Theater Maneuvers Via Particle Swarm Optimization *Daniel Showalter - AFIT* *Dr. Jonathan Black - AFIT*	*38DCASS-082* Optimal Aircraft Trajectories for Ground Collision Avoidance *Angela Suplisson - AFIT* *Richard G. Cobb - AFIT*	*38DCASS-144* Processing of Ti, Carbon Fabric, and Polymer Hybrid Using Laser Deposition and High Temperature Polyimide Infusion *Thao Gibson - UDRI* *G. P. Tandon - UDRI* *Brian Welk - OSU* *Hamish Fraser - OSU* *Tara Storage - AFRL* *Vernon Bechel - AFRL* *Jeff Baur - AFRL*	*38DCASS-111* Direct Metal Laser Sintering for Rapid HIFiRE 6 Wind-tunnel Model Fabrication *Joshua Stults - AFRL* *Brian Smyers - AFRL* *Nate DeLeon - AFRL* *Lance Jacobsen - GHI* *Andrew Dwenger - GHI*	16:35
38DCASS-125 Piezoelectric Bimorph Optimization for a Dual Actuated Flapping Wing Micro Air Vehicle *Robert Lenzen - AFIT* *Garrison J. Lindholm - AFIT* *Richard G. Cobb - AFIT* *Mark F. Reeder - AFIT*	*38DCASS-152* Crew Resource Management and reliability for commercial orbital spaceplane operations *P Menges - UC* *T. M. Edwards, Ph.D. - NKU*	*38DCASS-122* An improved response surface model using k-folding technique *Anoop Vasu - WSU* *Ramana V. Grandhi - WSU*	*38DCASS-145* Energy sustainable and Environmentally friendly Poly(urea imide) Coating with Remarkable Corrosion Resistance and Durability *Linqian Feng - UC* *Jude O. Iroh - UC*	*38DCASS-019* Sensitivity Analysis of HIFiRE-6 Design Variants Using Minimum-Resource Statistical Designs *Rick Graves - OAI* *Scott Sherer - AFRL*	16:55
Adjourn					17:15

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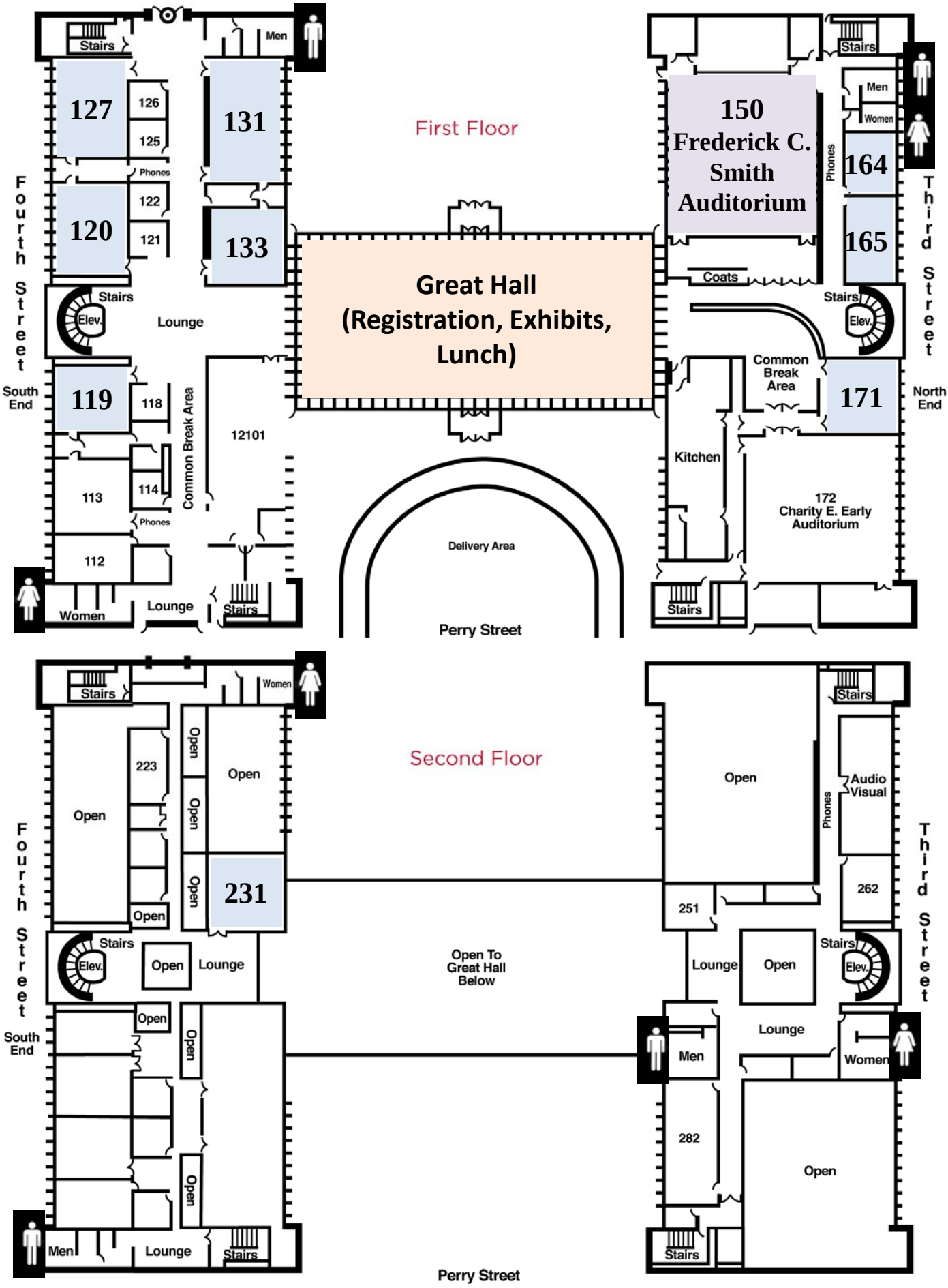

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