



FREQUENT FLYER

American Institute of Aeronautics and Astronautics
Northern Ohio Section

Newsletter - July 2019



Hello Northern Ohio Section,

My name is Christine Pastor-Barsi and I am your new Section Chair. In thinking about what I want to bring to the section during my tenure, I am hoping to work to help our members more clearly answer the elusive question, "What do I get out of AIAA?" I recognize that the answer to this question is different for each and every one of us. For some, membership is a resume booster. For others, it is a potential mechanism for finding better employment. Still for others, the social aspect is most prominent. With this consideration in mind, I believe that communication is crucially important. We can't begin to make your membership matter if you don't know what's going on and if we don't receive your feedback. Please visit the AIAA Engage site (<http://engage.aiaa.org>), engage in the discussions on the site, and adjust your settings to receive the notification emails. I invite you to visit and follow our social media pages, and to reach out to the council via email (links and addresses may be found on the last page of this newsletter). Finally, please bear with us as we try new things, and work toward re-inventing ourselves to better serve you, the member.

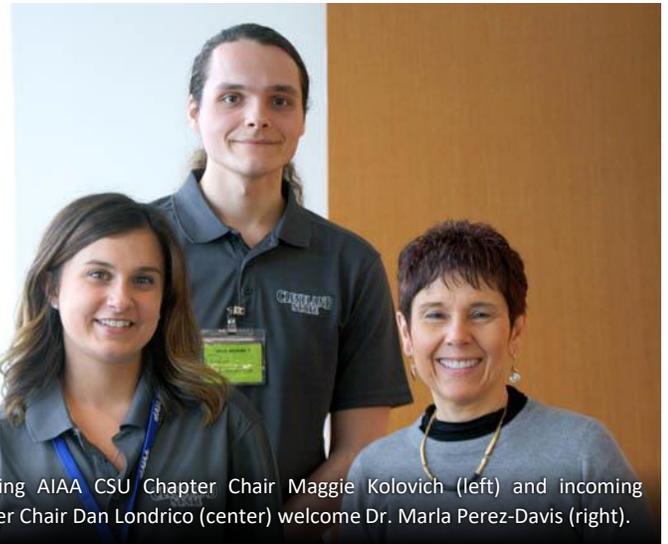
Thanks,
Christine Pastor-Barsi

Biography: Christine Pastor-Barsi is an Aerospace engineer with NASA Glenn Research Center. She graduated with her Bachelor of Mechanical Engineering degree in 2005 and her Master of Aerospace Engineering degree in 2007, both from the University of Dayton. Christine is a member of the Inlets and Nozzles Branch, where she performs research for the Hypersonic Technology Project. She currently supports research on air-breathing propulsion/re-usable high-speed propulsion systems. In her spare time, she enjoys photography, reading, running, and keeping up with her two little girls.

Cleveland State University's AIAA Student Branch hosts 2019 Region III Student Conference

The 2019 AIAA Region III Student Conference, hosted by Cleveland State University's (CSU) AIAA Student Branch on April 5th and 6th, was hugely successful in igniting and celebrating aerospace ingenuity amongst AIAA student members. "Many students very much appreciated the opportunity and especially the organization of the conference and the hospitality of CSU," noted AIAA Region III Director, Dan Jensen, who was in attendance.

With 14 different universities in attendance, accounting for nearly 54% of AIAA student branches in Region III, the size of the conference significantly exceeded expectations. Overall, 33 students, 4 faculty, and 11 professional AIAA members united to support efforts in the advancement of the aerospace industry.



Outgoing AIAA CSU Chapter Chair Maggie Kolovich (left) and incoming Chapter Chair Dan Londrico (center) welcome Dr. Marla Perez-Davis (right).

The conference kicked off with an inspiring keynote presentation by Dr. Marla Perez-Davis, Deputy Director of NASA Glenn Research Center. Dr. Perez-Davis' talk focused on NASA GRC Core Competencies, covering projected outcomes of current missions and emphasizing the importance of organizations like AIAA.

Following the keynote presentation, some attendees were taken on tours of The Human Motion Control Lab, and The Parker Hannifin Fluid Power Systems Lab at Cleveland State University.

The NOS Council also worked with CSU AIAA chapter members to arrange a trip to NASA, which consisted of a tour of the Zero Gravity Research Facility and Graphics & Visualization (GVIS) Lab, and a presentation on higher education opportunities at NASA with Dr. David Kankam.

Following the tours, participants were taken to the 100th Bomber Group Restaurant for dinner and a social event, sponsored by the AIAA Northern Ohio Section. The social event was an aerospace-based trivia game which provided a great opportunity for participants to interact with each other, test their aerospace knowledge, and win fun aerospace themed prizes.

Presentations started first thing on the following morning. Overall, there were 14 presentations, consisting of 6 undergraduate individual, 3 undergraduate team, and 5 graduate individual. Presentations were exciting and displayed a wide array of the aerospace research being investigated in Region III universities. A distinguished panel of GRC employees, contractors, and retirees volunteered to judge the papers and oral presentations.

The conference concluded with presentations from the head judge, Christopher Pestak, and from the CSU mechanical engineering department's chair, Dr. Brian Davis. Chris presented on the importance of systems engineering, and Dr. Davis presented on his experiences in engineering, and

2019 Region III Student Conference Judges

- Christopher Pestak - *Head Judge*
- Mary Jo Long-Davis, NASA Glenn Research Center
- Kevin Melcher, NASA Glenn Research Center
- Peggy Cornell, NASA Glenn Research Center
- Brian Motil, NASA Glenn Research Center
- Joe Connolly, NASA Glenn Research Center
- Rosa Padilla, Universities Space Research Association (USRA)
- Tadas Bartkus, Ohio Aerospace Institute
- Allen Arrington, HX5-Sierra
- Michael Piszczor, retired from NASA Glenn Research Center
- Paul Penko, Baldwin Wallace University

provided helpful insight into starting a career as an entry level engineer. Following these presentations was the culminating dinner and awards ceremony, where the presentation winners were announced.

NASA Glenn Research Center, and the Council of the AIAA Northern Ohio Section, played a key role in the success of the conference. During registration, Denise Ponchak of GRC set up a table alongside CSU students, and provided registrants with information on pursuing a career at NASA.

(Text: Maggie Kolovich, Photos: Region III members)



Dr. Marla Perez-Davis, Deputy Director of NASA Glenn Research Center, kicked off the conference with an inspiring keynote presentation.

Individual Undergraduate Winners		
Collin O'Neill	Ohio State University	Active Flow Control in Compact Inlet/Diffuser Model of Next Generation Tactical Aircraft
Karthik Srivatsan	University of Michigan- Ann Arbor	Simulation and Dynamics of a Hexacopter After a Motor Failure
Curtis Flack	Cleveland State University	Flow Visualization of a Nature-Inspired Low-Pressure Turbine Blade
Team Undergraduate Winners		
Siddhant Tandon Tyler Swedes Julia Springer Justin Zyck Noah Marquand	Purdue University	Specialized Terrestrial Rotorcraft Explorer
Andrew Truskowski Michael Mongin	University of Dayton	Aerodynamic Feasibility Study on Highly Distributed Lifting Configurations
Austin Wolfgram Rishi Jashnani Sophia Yu Collin Sageman	University of Michigan- Ann Arbor	Proof-of-Concept Student-Built Centrifugal Pump
Graduate Winners		
Braxton Harter	Ohio State University	Lagrangian Coherent Structures in Optimal Vortex Ring Formation
Nicole Whiting	Ohio State University	Design of an Experimental Facility for Characterization of Dynamic Stall
Erin Tesny	Cleveland State University	Design of Heat Exchanger for Intense Cooling of Inlet Bleed Air at Mach Numbers



Region III Conference organizers and attendees taking a moment to enjoy the sights and sounds of beautiful downtown Cleveland.



1st Place Winner in the Graduate Category, Braxton Harter (right) with Dan Jensen, AIAA Region III Director (left).



1st Place Winners in the Undergraduate Team Category, Purdue University, with Dan Jensen, AIAA Region III Director (left).



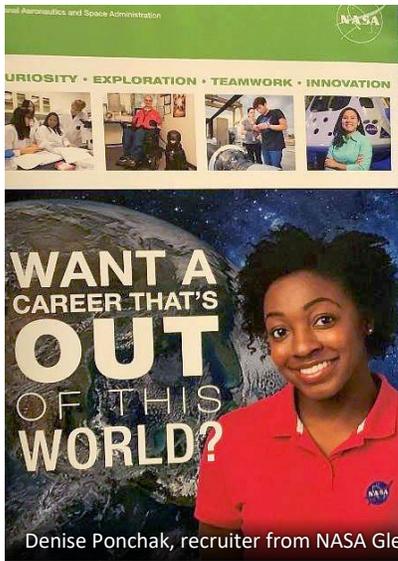
Kicking off the opening dinner with a Trivia Icebreaker.



Opening dinner at the 100th Bomb Group.



Head Conference Judge, Chris Pestak, speaking on the importance of systems engineering.



Denise Ponchak, recruiter from NASA Glenn Research Center.



Student members after touring the NASA Glenn GVIS Lab (photo: GVIS Lab)

NASA Glenn Facilities Tour Kicks Off 2019 Region III Student Conference

On April 5, 2019, the GRC Office of Education and the AIAA Northern Ohio Section supported a tour of GRC facilities for students attending the AIAA Region III Student Conference at Cleveland State University. This year, approximately 25 students participated in the tour, representing Cleveland State University, Williams College, University of Michigan, Ohio State University, and Purdue University. David Kankam

opened the tour with a presentation about NASA internship and student opportunities. The students were then able to experience the Graphics and Visualization (GVIS) Lab and tour the Zero Gravity Research Facility.

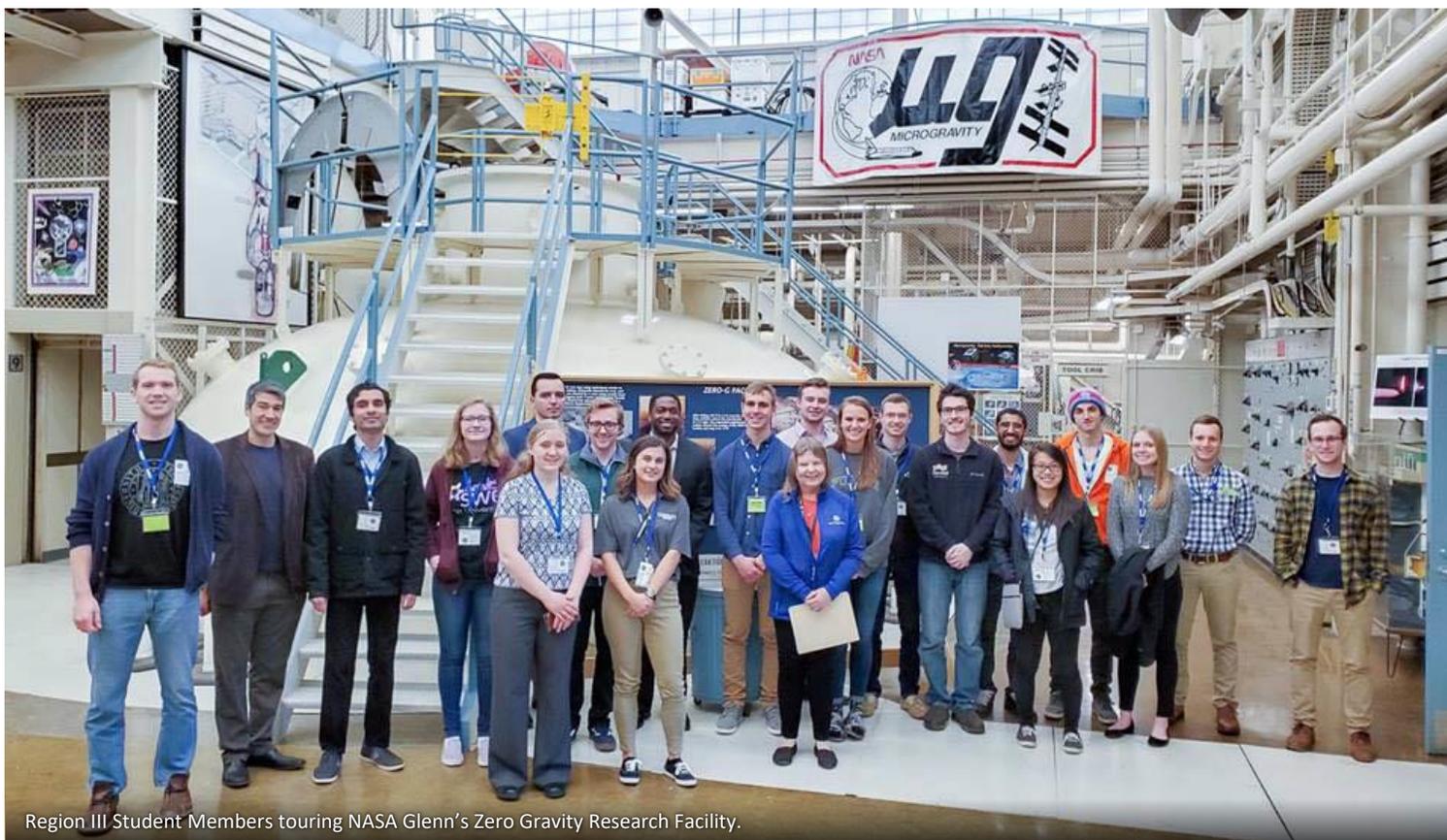
(Text: Joe Connolly, Photos: Edmond Wong and Maggie Kolovich)



David Kankam from the NASA GRC Office of Education.



Experiencing the GRUVE Virtual Reality Lab, part of the GVIS Lab at NASA GRC.



Region III Student Members touring NASA Glenn's Zero Gravity Research Facility.

AIAA and ASME Enjoy an Evening Reflecting on Northern Ohio's contributions to the Apollo Program

The AIAA Northern Ohio Section joined forces with the American Society of Mechanical Engineers (ASME) Cleveland Section to celebrate the 50th Anniversary of the Apollo Landing, with a program highlighting Northern Ohio's contributions during the Apollo era. The April 24th evening event at the Ohio Aerospace Institute (OAI) combined ASME's 23rd Annual History & Heritage and Awards Banquet and an AIAA Distinguished Lecture.

Before the dinner some 90 guests browsed Apollo memorabilia and other exhibits in the lobby of OAI. Did you know that the two huge NASA crawler-transporters at KSC that move vehicles from the Vertical Assembly Building (VAB) to the launch pad were designed and built in Ohio by Marion Power Shovel Company? The crawlers, nicknamed "Hans" and "Frans," used components from Rockwell International and cost \$14M each. The crawler exhibit featured pictures of the crawler and information about the Huber Museum in Marion, Ohio, which proudly displays a huge tread shoe from one of the crawlers. The Huber Museum held a dedication ceremony for this display on May 18, 2019, at 1:00 p.m.

The Morrison Knudsen (MK) Corporation of Boise, Idaho, and its subsidiary, the HK Ferguson (HKF) Company of Cleveland, did project work for NASA in the 1960's. A former employee



Attendees browsing Apollo memorabilia and exhibits.

of HKF, Mr. Joseph Yurko, recalled stories and events surrounding these exciting years of the Apollo missions. Mr. Yurko displayed copies of the MK monthly newsletter, known as the EM-Kayan, which documented milestones that NASA and MK achieved together during this exciting endeavor to reach the Moon. NASA had awarded the Vertical Assembly Building (VAB) Project to MK in 1964. Under this \$63M contract, MK performed the principle phase of construction to



Attendees gather in the OAI Sun Room for a delicious buffet dinner and presentation of awards.

erect the world’s largest building enclosure at the time, rising to a height of 535 feet. Interestingly, the HKF Division also worked with the NASA Lewis (now Glenn) Research Center in 1967 to provide space research facilities at the Engine Research Building and Supersonic Wind Tunnel Complex.

Another table displayed original Apollo 11 photographs published and sold by NASA in 1969, and magazines from the era showing the public’s excitement with our nation’s mission to land on the Moon.

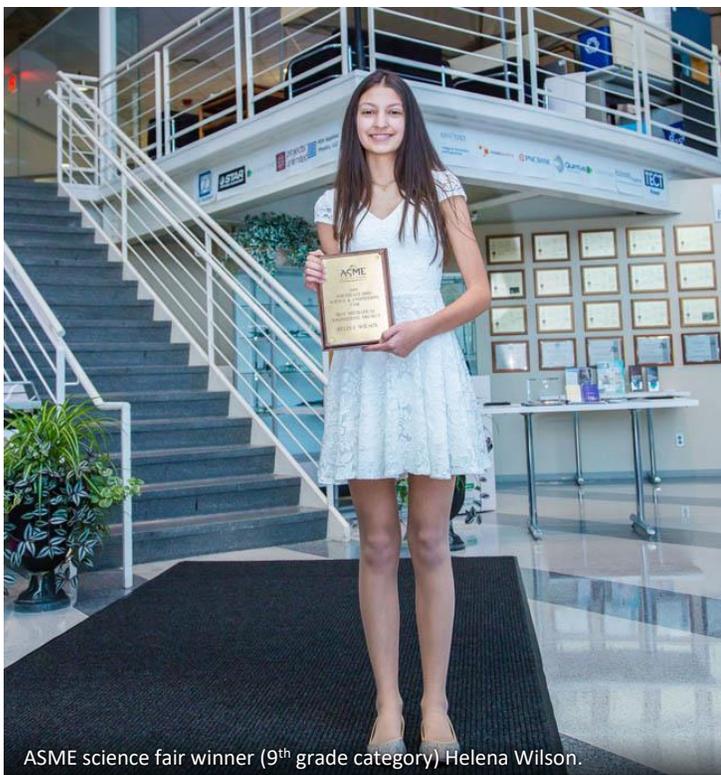
Guests at the event were treated to student presentations by ASME-award-winning science fair recipients. In the 7th and 8th grade category, Dmitry Lipert from Buckeye Jr. High School won for his investigation of the effect of different air intake manifolds on motorcycle engine power. Dmitry evaluated the output power sensitivity of a four-cycle motorcycle engine to the geometry of carburetor air intake manifold extensions. Dmitry displayed technical insight by elaborating on areas where his design was not ideal for power output. Through his understanding of the engine cycle he justified why his results varied at lower rpms and explained how future analysis could be streamlined.

Helena Wilson, a 9th grader from Avon Lake High School, experimented with aquaponics in her project “Farming of the Future.” Helena was inspired by the environmental problems of drought, famine, and climate change. She concluded from her project that with aquaponics, food supplies could be grown in the harshest environments like deserts and in urban



ASME Garrett Morgan scholarship winners, Michael Massey (left) and Arieana Powell (right).

areas, improving food security and environmental sustainability. She used ammonia within tilapia feces to fertilize soil for plant growth. Helena’s passion for her work and its simplicity made this experiment a winner.



ASME science fair winner (9th grade category) Helena Wilson.



ASME science fair winner (7th—8th grade category) Dmitry Lipert.

The evening continued with a buffet dinner in OAI's Sun Room. After dinner, ASME presented awards to the science fair winners and recognized the winners of the ASME Garrett Morgan scholarships, Arieana Powell and Michael Massey. Arieana Powell is a senior at Cleveland Early College High School who will be attending Ohio State University in the fall to major in Aeronautical and Astronautical Engineering. Michael Massey is graduating from Cleveland School of Science and Medicine and plans to study bioengineering and economics at Stanford University.

The distinguished lecture "The Final Journey of the Saturn V," co-presented by Prof. Andrew R. Thomas, University of Akron, and Paul Thomarios, was the capstone of the evening. Paul Thomarios and Andrew R. Thomas are co-authors, along with the late Gene Cernan, Commander of Apollo 17 and the Last Man on the Moon, of the book *The Final Journey of the Saturn V* (University of Akron Press, 2012).

Paul Thomarios is President of Thomarios, an Akron-based corporation that specializes in commercial and industrial painting and coatings, and historic spacecraft, aircraft, and building restoration. Paul took over the family business from his father, a first-generation Greek immigrant.

In 1996, The Smithsonian Institution contracted with Thomarios to restore and preserve the Saturn V Rocket, which is currently on display at Kennedy Space Center. Since then, Thomarios has restored and preserved other space and aviation artifacts such as Neil Armstrong's FD5 "Skylancer"



Paul Thomarios provided insights into the restoration of the Saturn V rocket.

airplane, Titan and Atlas rockets, and Gemini, Apollo, and Mercury capsules.

Dr. Andrew R. Thomas is an Associate Professor of International Business at the University of Akron. He is an author or editor of 23 books, including "Soft Landing: Airline Industry Strategy, Service, and Safety," "Aviation Insecurity: The New Challenges of Air Travel," "Air Rage: Crisis in the Skies," and "Aviation Security Management."

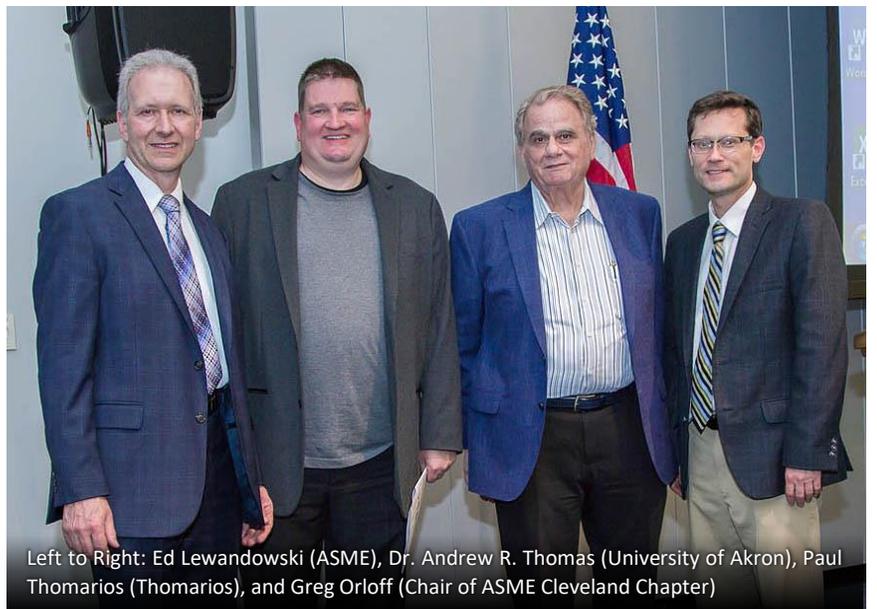
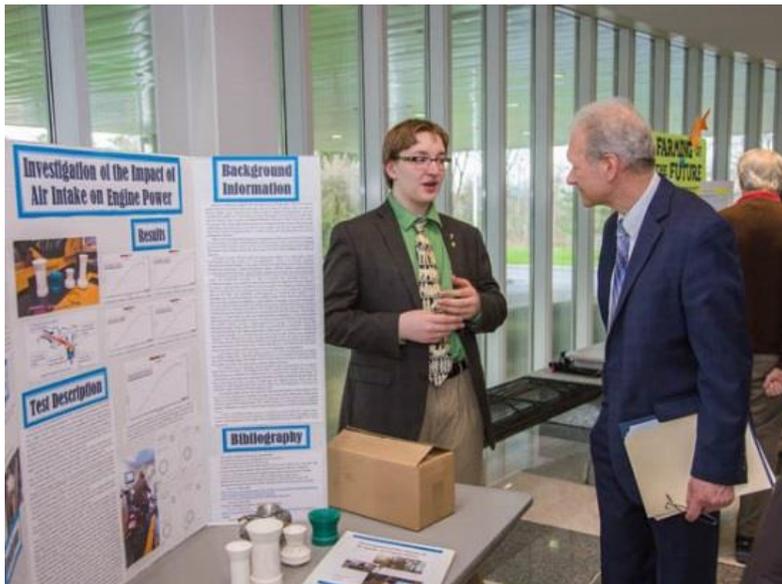
Prof. Thomas and Mr. Thomarios entertained the audience with insights into what it takes to restore and preserve a rocket that has been left outdoors at the mercy of the Florida environment, flora, and fauna for decades. They shared some of the interesting findings from inside the rocket, and told the story of the rocket's journey to becoming a key component of the total mission experience destination at Kennedy Space Center.

How fitting it was to have a University of Akron professor and the owner of the local company that restored KSC's Saturn V speak at this event that celebrated Ohio's contribution to Apollo. We remembered the amazing accomplishments from 50 years ago, as we are on the cusp of returning to the Moon to stay, then continuing on to Mars!

(Text: Edward Lewandowski, Photos: Edmond Wong)



Prof. Andrew R. Thomas (left) and Paul Thomarios (right) presenting "The Final Journey of the Saturn V."



Left to Right: Ed Lewandowski (ASME), Dr. Andrew R. Thomas (University of Akron), Paul Thomarios (Thomarios), and Greg Orloff (Chair of ASME Cleveland Chapter)

AIAA NOS Participates in CANstruction Charity Event

For the third year in a row, a team of AIAA NOS members took part in the CANstruction™ charity event at the South Park Mall in Strongsville, April 4-14, 2019. At the event, competing teams led by architects and engineers designed giant sculptures made entirely out of canned foods, which are later donated to the Cleveland and Akron Food Banks.

To meet this year's theme of "Heroes and Villians," the AIAA team built a structure with the front depicting Donkey Kong and Mario, while on the back was Pauline. Donkey Kong was the villian in the original classic video game, although he went on to be the hero in later titles. As one observer stated, "The real villian is Hunger."

Sponsors who generously donated funds to enable the purchase of the cans of food for the structure were: Corporate Sponsors - TFOME: HX5-Sierra, Jacobs, and MSM Group; Universities Space Research Association (USRA); Individual Donors - Rula Coroneos, Jolene Moody, and Cynthia Sheeler.

The CANstruction™ team is: John Wolter, Mike Borghi, Rula Coroneos, Dan Gotti, Stefanie Hirt, Henry Korth, Lexi Lee, Logan Micham, Taylor Pember, Manan Vyas, and Linda Yoon.



AIAA NOS Supports Student Researchers Flight Investigation of Flame Spread in Microgravity

As part of our continuing efforts to encourage students to pursue careers in aerospace, the AIAA Northern Ohio Section (NOS) lent significant volunteer and financial support to a team of student researchers at the NASA Glenn Research Center (GRC) who designed and built an experiment to test the effects of vibration on flame spread in microgravity. Research on flame behavior in microgravity is used to improve safety standards for manned spaceflight environments such as crew capsules and the International Space Station (ISS). The experiment flew on-board the successful launch of Blue Origin's New Shepard suborbital space vehicle on May 2, 2019 ([YouTube Video Link](#)).



Photo credit: Blue Origin

The student team was led by Evan Rose - a Case Western Reserve University (CWRU) graduate student and student intern with Universities Space Research Association (USRA). Also on the team is Satya Nayagam - a freshman at Princeton University, and Brian Sun - a freshman at Yale University. The students were mentored by AIAA Associate Fellow Dr. Vedha Nayagam, and Mr. Glenn Lindamood, an Electrical Engineer at GRC. Both Dr. Nayagam and Mr.



Left to Right: The student team of Evan Rose, Satya Nayagam, and Brian Sun.

Lindamood volunteered many hours in support of the project. Financial and experiment support for the project was provided by AIAA NOS, USRA, and CWRU. The students built the flight experiment at the CWRU Sears think[box]. The Sears think[box] is a public-access innovation center on the campus of CWRU that provides a complete ecosystem for new product development, including everything from design and ideation resources to prototyping and fabrication equipment.

This experiment came into reality after the team's proposal won the Ken Souza Memorial Student Spaceflight Research Competition in 2017. This annual student research competition is supported by Blue Origin and coordinated by the American Society for Gravitational and Space Research (ASGSR) in memory of NASA space biologist Ken Souza. The student team was awarded a payload slot for their experiment on a Blue Origin launch, as well as a grant to develop their concept and build the flight experiment. At the time of the award and through the first year of the project, Satya Nayagam and Brian Sun were still in high school.

The successful flight experiment used the nearly three minutes of high-quality microgravity provided by the New Shepard flight to measure the rate of flame spread across a piece of ashless filter paper fuel (commonly used in microgravity combustion experiments) being oscillated at several different frequencies to show the influence of vibration on flame spread. The data returned from the flight will contribute to the body of knowledge in the area of spacecraft fire safety. Congratulations to Evan, Satya, and Brian on a job well done!



Evan Rose (center), the student team leader, pictured with the team mentors - Dr. Vedha Nayagam (L) and Mr. Glenn Lindamood (R).

(Text and photos Christopher Pestak)

Dr. James Gilland Talks Electric Propulsion

On Tuesday, March 26th, 2019, Dr. Jim Gilland of the Ohio Aerospace Institute (OAI) presented an informative lecture on Electric Propulsion (EP) sponsored by the Northern Ohio Section of AIAA and open to NASA GRC and the Greater Cleveland Community. The Lecture was entitled “Electric Propulsion Options and Design.”

The lecture started with an outline of propulsion systems, ranging from high-thrust low duration, liquid and solid propellant chemical rockets, medium thrust nuclear thermal rockets (NTR) with high temperature H₂ propellant thrust of one to two hours, and various implementations of low-thrust months long duration electric propulsion types, including electro-thermal, electro-static, and electro-magnetic propulsion systems. Electric Propulsion using ionized rare gas Xenon propellant features very high specific impulse (ISP) of up to 7000 sec (lbf/lbm/sec). By contrast, chemical propulsion systems may achieve an ISP of 400 to 450 sec, while nuclear thermal rockets are characterized by ISP values of 920 to 930 sec at H₂ propellant chamber temperatures above 2600 degrees K. Since EP systems rely on the availability of electric power, Dr. Gilland emphasized the importance of high capacity (even multi-megawatt) nuclear space power plants for successful EP missions.

Before closing his presentation, Jim also mentioned the “VASIMR” thruster concept proposed in 2010 by astronaut



Dr. James Gilland of the Ohio Aerospace Institute (OAI).

Franklin Chiang Diaz. This theoretical concept refers to a technique to achieve varying specific impulse at varying thruster power. Experimentation is still underway to test the validity of this EP system.

The lecture was followed by a spirited Q&A period, lasting over 10 minutes. There were over 35 attendees.

(Text: Al Juhasz, Photos: Edmond Wong)



Congressional Visit Day 2019

The AIAA Congressional Visit Day occurred on March 20, 2019. The Ohio Delegation consisted of seven members, which included 5 students, Northern Ohio Section’s Public Policy Officer Victor Canacci and lead Ohio delegate Kayleigh Gordon, a veteran of Congressional Visit Day from Ohio State and someone currently employed at Wright Patterson Air Force Base.

The Ohio delegation was divided into two teams that met with office staffers of nine of Ohio’s 16 Representatives and both Senate offices. The focus areas discussed were the impacts of aerospace in Ohio including STEM, the importance of airports to local economies and to national security, and the impacts that two of the biggest national aerospace research labs in the country (Wright Patterson Air Force Base and NASA Glenn Research Center) have to the aerospace industry and the Ohio economy. Connections were made with staffers who were very supportive of AIAA’s key issues, and these contacts were forwarded to AIAA’s Washington DC Public Policy lead.



Ohio State University delegates: Eric Kaiser, Austin Karr & Steven Romeo.



Left to Right: Victor Canacci (NOS Public Policy Officer), Brian Munguia, Fouad Khoury, and Kayleigh Gordon (Lead Ohio Delegate).

Upcoming Events

AIAA Northern Ohio Section Night at the Ballpark

Friday, July 19, 2019

7:10 pm

Progressive Field

Come watch your Cleveland Indians take on the Kansas City Royals. We have a block of 40 seats in Section 309. You'll get a great view of the field, scoreboard and the post-game fireworks!

In addition to the Fireworks display, this game will feature many other great promotions including:

- "Pre-Game in the District"
- Sugardale Dollar Dog Night
- Bottle Opener Sunglasses
- "Block Party"

Reserve your tickets ONLINE by July 18 at:

<https://www.eventbrite.com/e/aiaa-nos-indians-game-tickets-64070511625>

If you have any questions, contact:

aiaanos.pastchair@yahoo.com



Annual Honors and Awards Picnic

Thursday, August 8, 2019

5:00 – 7:00 PM

*Wallace Lake Canopy, Mill Stream Run Reservation,
Cleveland Metroparks*

Please join us as we recognize the many member achievements within the section this past year, socialize a bit, and enjoy some games. A delicious barbeque dinner will be catered by Famous Dave's.

Please note that the location is new this year! Wallace Lake Canopy is located off Valley Parkway, south of Bagley Road in Berea.

Agenda:

- 5:00 pm – Social
- 5:30 pm – Catered BBQ Dinner
- 6:00 pm – Honors & Awards Program
- 6:30 pm – Games, Trivia, etc

>> Admission is free, but RSVP is required <<

Please RSVP by August 5, 2019, 5:00 pm to Bill Marshall at aiaanos.awards@gmail.com or go to:

<https://www.signupgenius.com/go/805094FABAC22AAFD0-2019>

We hope to see you there!



Northern Ohio Section Officers and Council Members (June 1, 2019 – May 31, 2020)

Officers

Christine Pastor-Barsi	<i>Chair</i>	aiaanos.chair@gmail.com
Joe Connolly	<i>Vice Chair</i>	aiaanos.vicechair@gmail.com
Jonathan Litt	<i>Secretary</i>	aiaanos.secretary@gmail.com
Kevin Eliason	<i>Treasurer</i>	aiaanos.treasurer@gmail.com
Peggy Cornell	<i>Past Chair</i>	aiaanos.pastchair@gmail.com

Council Members

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Bill Marshall	<i>Honors & Awards</i>	aiaanos.awards@gmail.com
Erin Tesny	<i>Membership</i>	aiaanos.membership@gmail.com
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Denise Ponchak	<i>Member-At-Large</i>	
Cynthia Calhoun	<i>Member-At-Large</i>	
Maggie Kolovich	<i>Member-At-Large</i>	
Dan Londrico Zachary Allen	<i>Student Branch Representative (CSU)</i>	
David Irwin	<i>Student Branch Representative (YSU)</i>	
Ryan Murphy	<i>Student Branch Representative (CWRU)</i>	



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