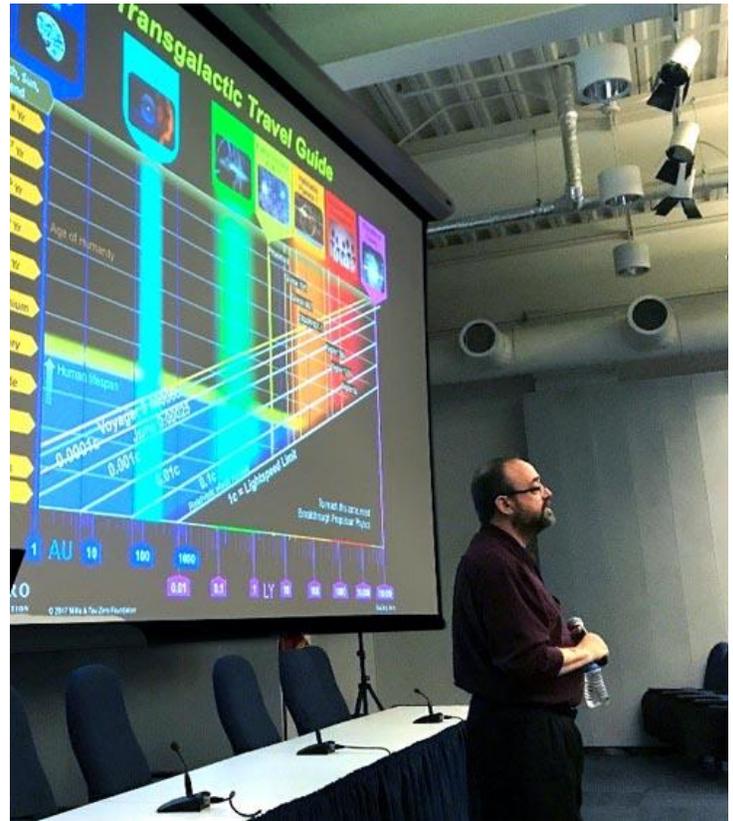


Distinguished Lecture: Marc Millis

Mr. Marc Millis spoke to an attentive audience at the Ohio Aerospace Institute (OAI) on Tuesday, March 6, 2018 at an event jointly sponsored by the AIAA Northern Ohio Section and OAI. With a background in instrumentation for advanced chemical and electric propulsion, Mr. Millis has spent most of his career examining the challenges of true interstellar travel in terms of feasibility and the necessary research to achieve this capability. He led NASA's Breakthrough Propulsion Physics project, which examined such concepts from 1995-2002. Millis and colleagues went on to compile the first-ever scholarly book about such breakthrough ambitions, *Frontiers of Propulsion Science*, published by AIAA in 2009. After taking early retirement from NASA in 2010, he became one of the founders of the Tau Zero Foundation (<https://tauzero.aero/>), an organization that seeks to make human interstellar travel possible.

The topic of the lecture was "Chasing a Space Drive in the Twenty First Century." Millis defined a "space drive" as a means of propulsion that does not use propellant. A spacecraft that moves without propellant or interaction with the known fields (gravity, or electric and magnetic fields) around it would violate our known physical laws; however, several labs have recently reported anomalous measurements that appear to do just that. Millis spoke about



his time working with Dr. Martin Tajmar in Germany, at Technical University Dresden (TUD), testing space drives and

other possible forms of advanced propulsion, and how things like Earth's gravity can impact experiments being done to prove the feasibility of faster-than-light flight. He also discussed how three independent labs recently replicated the anomalous thrust measurements from Dr. Jim Woodward's "Mach Effect Thruster" – a device using a hypothesized "inertial mass fluctuation" to create thrust without expelling propellant.

The event was well attended with about 30 attendees, and several people stayed after to discuss further with Mr. Millis. For those who missed this talk, below are links to some of Marc's TED Talks, which are posted online.

<https://www.youtube.com/watch?v=1s5tWSLsr1M>

<https://www.youtube.com/watch?v=9doOLHeW8p4>



In Memoriam: Betty Dabrowski

The Northern Ohio Section of AIAA was saddened at the passing of Elizabeth (Betty) Dabrowski. For many years, Betty was an active member of the Northern Ohio Section as an AIAA Educator Associate. Betty was a great science teacher and a driving force in the education of future scientists and engineers in Northeast Ohio. She was an instructor of chemistry and science for over 35 years at Magnificat High School in Rocky River, and previously at other schools. Betty earned her BS and MS degrees in chemistry, and was a Fellow of the American Chemical Society - a rarity for a high school educator. Her students were active participants in Young Astronaut Day every year, and Betty also frequently joined us at AIAA lectures, our annual picnic, and outings to baseball games.

Throughout Betty's career, she was dedicated to helping all her students succeed, regardless of whether they were just struggling to get through a challenging science course or if they were on their way to pursuing a college degree in a scientific discipline. She was active both in and out of the classroom, supporting numerous science education enhancement activities, and she edited several high school Chemistry textbooks. Betty organized and oversaw the Magnificat Chemistry Club for many years, and she was extremely successful at getting her students involved in extra-curricular science-related activities.

In 2013, she received the AIAA Foundation's prestigious Educator Achievement Award. The award was in recognition of her highly effective work and life-long dedication to science education.

Betty will be missed by her many friends and colleagues, and especially by the many former students she taught and mentored.

NASA's Sutliff Talks Aeroacoustics at CSU

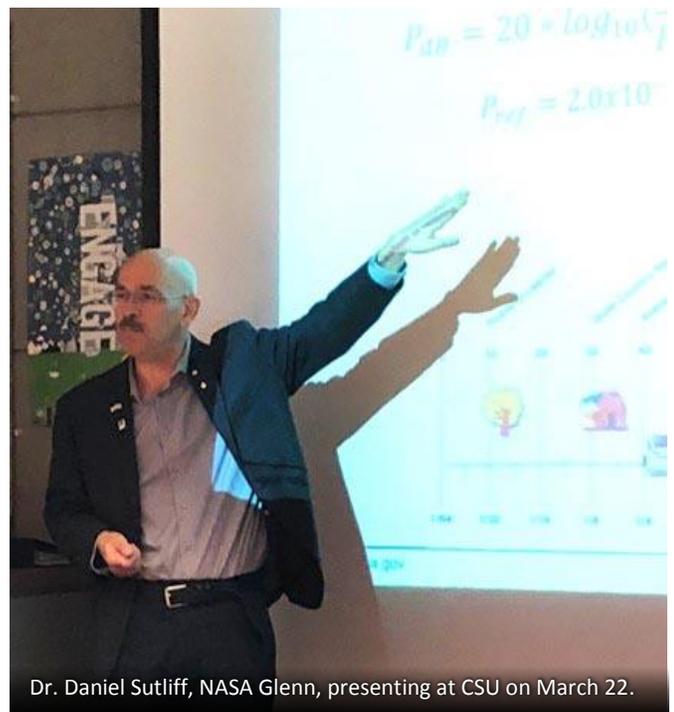
Dr. Daniel Sutliff, Aerospace Engineer in NASA Glenn Research Center's Acoustics Branch, visited students at Cleveland State University on March 22, 2018 to share his expertise on some fundamental concepts in aeroacoustics. He also engaged the students by describing how one ongoing noise reduction research project, NASA's DGEN Aero-Propulsion Research Turbofan (DART), is used in instrumentation development and measurement technologies.

"I had the best time. Great subject matter expert. I think it is very useful to the students' development."

- Bogdan Kazul, Mechanical Engineering,
Assistant Professor of Practice.

Dr. Sutliff has been an AIAA member since 1984 and is a current member of the AIAA Aeroacoustics Technical Committee. He conducts research into the development of aircraft engine noise reduction technology, and leads multidisciplinary teams in developing fan noise reduction concepts, and state-of-the-art aeroacoustic measurement technologies.

Dr. Sutliff recognizes the importance of encouraging engineers early in their careers. By mentoring several students throughout the world, and actively reaching out to local universities, he does just that.



Dr. Daniel Sutliff, NASA Glenn, presenting at CSU on March 22.

NOS Participates in CANstruction Charity Event

A team of AIAA NOS members took part in the CANstruction™ charity event at the South Park Mall in Strongsville on April 13-22, 2018. At the event, competing teams led by architects and engineers designed giant sculptures made entirely out of canned foods, which are subsequently donated to the Cleveland and Akron Food Banks. To meet this year's theme of "Can Your Imagination Run Wild," the AIAA team built Marvin the Martian's spaceship and the Curiosity rover. The team won an award for the 'Best use of labels.' The sponsors who generously donated over \$2000 to purchase the cans for the structure were:

Cooperate Sponsors: Chemsteel Construction, HX5 Sierra, Universities Space Research Association, Bendix Commercial Vehicle Systems, Deerpath, and Peaceful Fruits.

Individual Donors: Pat and Ron Bowman, Zeke and Brittany Flegel, Gary and Kelly Flegel, Zeb and Celeste Flegel, Sanjay Garg, Scott Jones, Jinho Lee, Jennifer Molnar, Jolene Moody, Paul Tsao, and Lois Weir.

Also, special thanks to Strongsville Chick-Fil-A for providing food during the build, and Heinen's of Strongsville for assistance in acquiring the silver labeled cans used for the spaceship structure.

The CANstruction™ team lead by John Wolter included: Ashlie Flegel, Kevin Bowman, Stephanie Hirt, Rula Coroneos, Julie Kleinhenz, Alexis Lee, Victor Canacci, Logan Micham, Linda Yoon, Dan Gotti, and Manan Vyas.



The narrative for the build: Since 2012, NASA's Mars Curiosity rover has been exploring the surface of Mars. The discoveries and photos that it and other planetary rovers and landers have returned from the planet have inspired the imaginations of future scientists, engineers, and explorers. Certainly when it comes to exotic locations, you can't get much more "WILD" than Mars!

But Mars isn't so wild to its native son, Marvin the Martian. He keeps encountering these earthling interlopers on his planet! Here Marvin has returned home from his travels in his silver spaceship, composed of silver cans of sweet peas and red cans of tomato sauce, to find yet another one of the earthlings' pet "rovers" on his planet. While Marvin is giving the evil eye to the Curiosity rover, made of white and brown cans of evaporated milk and sloppy joe, it stares back at him curiously with its camera boom. Meanwhile the scientists on earth suffer a brief and inexplicable loss of signal...



The CANstruction build team (left to right): Logan Micham, Kevin Bowman, Stephanie Hirt, Marvin the Martian, Ashlie Flegel, John Wolter, Julie Kleinhenz.

2018 Class of AIAA Associate Fellows

The AIAA Associate Fellows Recognition Ceremony was held on Monday, January 8, 2018, in conjunction with the AIAA SciTech Forum at the Gaylord Palms in Kissimmee, Florida. Each year, only one Associate Fellow is selected for every 150 voting members of AIAA. The Associate Fellows Class of 2018 had 134 members, three of whom were from the Northern Ohio Section: Dr. Dexter Johnson and Jonathan S. Litt of NASA Glenn Research Center, and Dr. Peter Y. Peterson of Vantage Partners, LLC (VPL). AIAA Associate Fellows are individuals of distinction who have made notable and valuable contributions to the arts, sciences, or technology of aeronautics or astronautics. Congratulations to our section's newest Associate Fellows! *(Photos courtesy of AIAA)*



Jonathan Litt, NASA Glenn, receiving Associate Fellows certificate from Jim Maser, Immediate Past President and Laura Richard, Vice President, Member Services.



Dexter Johnson, NASA Glenn, receiving Associate Fellows certificate.



Peter Peterson, VPL, receiving Associate Fellows certificate.



Region III inductees with Region III Director Dan Jensen (front row, left). The NOS inductees are Litt (front row, third from left), Petersen (back row, third from left), and Johnson (back row, second from right).

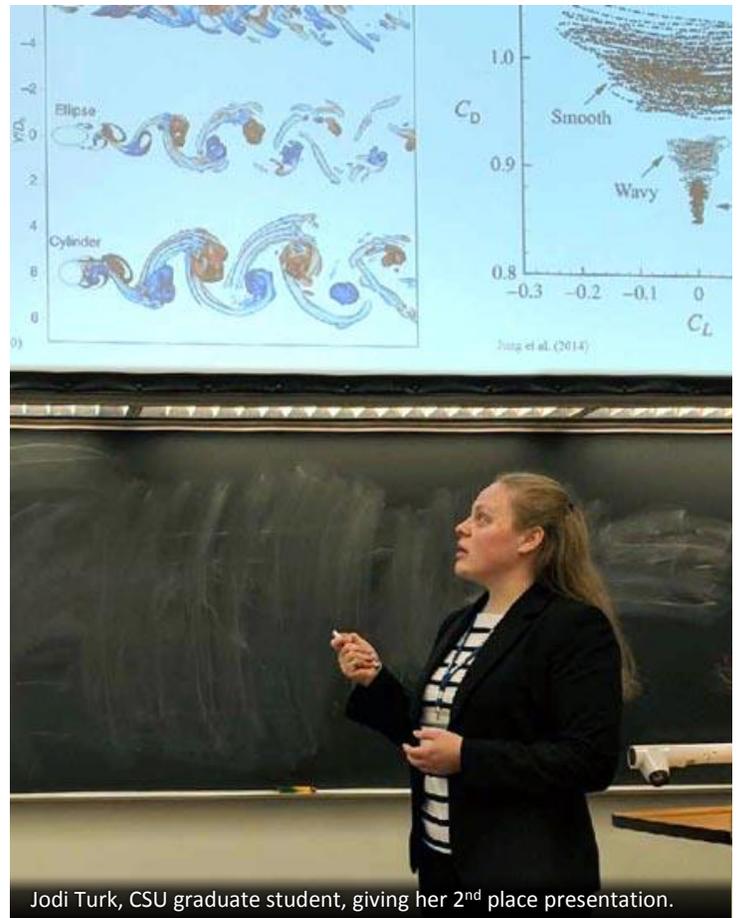
Region III Student Conference

The American Institute of Aeronautics and Astronautics (AIAA) sponsors student conferences in each AIAA Region for student members at both the undergraduate and graduate levels. This year, Purdue University hosted the Region III conference on April 13 -14. Students from Cleveland State University, Purdue University, The University of Michigan, and The University of Illinois, competed for monetary prizes by giving formal presentations that were judged for technical content.

“The conference was a wonderful way to learn about research opportunities in the field and to see what my peers are working on. I met a lot of great students that share my passion for aerospace and can’t wait for the conference next year.”

– Maggie Kolovich, Cleveland State University

This year, Cleveland State undergraduate students Jose Carmona and Maggie Kolovich, and graduate students Jodi Turk and Peter Urban represented The Northern Ohio Section of AIAA at the conference. Congratulations to Jodi Turk, who was presented 2nd place in the graduate category by Dr. Tom Shih, Head of the School of Aeronautics and Astronautics at



Jodi Turk, CSU graduate student, giving her 2nd place presentation.



(Left to right) Jose Carmona, Jodi Turk, Maggie Kolovich and Dr. Wei Zhang (Advisor), from Cleveland State University, posing with a statue of Neil Armstrong at Purdue University.

Purdue, for her research on *Particle Imaging Velocimetry Analysis of the Interaction of a Real Seal Whisker with the Surrounding Flow: Vortex Shedding and Vortex Induced Vibration*.

Not only did attendees have the opportunity to network with students in other AIAA chapters, they were also taken on private tours of Zucrow Laboratories, the nation’s largest university propulsion laboratory, with research encompassing: aerodynamics of turbo machinery, aeroacoustics, combustion, fluid mechanics, particle flow heat transfer, and more.

Keynote speaker, Daniel L. Dumbacher, addressed current milestones within the aerospace community and emphasized AIAA’s role in the future of space exploration and the development of aerospace technology. Dumbacher encouraged the students to “Keep asking why,” and provided a warm conclusion to the weekend’s events.

Northern Ohio Section Judged and Sponsored Special Awards for Area Science Fairs

In March 2018, the AIAA Northern Ohio Section continued its support of the Northern Ohio regional science fairs. Each year NOS offers \$400 in prizes for aerospace-related projects, which are judged by volunteer members of the section.

The Northwest District Science Day (NWSDS) science fair was held at the University of Toledo student union on Saturday March 10. Justin Elchert, Darren Benn, and James Akers all drove from Cleveland that morning to judge the projects. Students were grouped into two categories, 5th – 6th grade, and 7th – 12th grade, with over 50 total science projects on display. AIAA NOS judges evaluated a total of 15 science projects broadly related to aerospace engineering and sciences, and awarded a 1st place and two 2nd place prizes in each category for a total of six prizes.

The Northeastern Ohio Science and Engineering Fair (NEOSEF) took place at Cleveland State University on March

13. There were over 400 projects at this fair in a wide range of categories covering grades 7 – 12. The judges were given time to look at the displays and down-select, then interviewed around 12 students to select the winners. The judges were Kyle Johnson, David Sagerser, Al Juhasz, and Julie Kleinhenz.

Judge James Akers summed up the experience at NWSDS; “The range of the aerospace science projects, the enthusiasm, motivation, and creativity of the students, and the wonderful interactions with the students were professionally and personally rewarding. Many of the students incorporated surprisingly advanced scientific methods into their projects as well as unique concepts for solving existing engineering challenges. This science fair provided a glimpse into the making of outstanding future engineers, scientists, and problem solvers. This was a wonderful experience and a great way to get involved with students. As always, AIAA members are encouraged to get involved and this is one of many very rewarding and fun options.”

Northeastern Ohio Science and Engineering Fair (NEOSEF) Prize Winners

Prize	Name	School	Project
1 st place, \$50	Samia Menon	Hawken Upper	Assessing the feasibility of a Gesture based human robotic swarm interaction platform through the creation of an intuitive smart glove
1 st place, \$50	John Shin	Birchwood Elementary	Predicting Geomagnetic storm activity with GPS
2 nd place, \$25	David Anand	Home school	Use of haptic feedback controller to counter the effects of varying levels of gravity on the vestibular system of interplanetary space travel
2 nd place, \$25	Samuel Condrich	St. Albert the Great Elementary	Traction on Mars
2 nd place, \$25	Shree Ghosh	Solon Middle	Which components of a steam based engine result in the greatest velocity
2 nd place, \$25	Daniel Anand	Home School	Beam me up Scotty! Mitigating the decibel levels of the BEAM space module using a 1:10 scale model with acoustic engineering and computer simulations

Northwest District Science Day (NWSDS) Prize Winners

Prize	Name	School	Project
1 st place, \$50	Gracelynn Grabowski, 5 th Grade	Regina Coeli	Static Electricity.
1 st place, \$50	Tesa Vollmar, 7 th Grade	St Patrick	Which Straw Structure Protects An Egg Best?
2 nd place, \$25	Masen Welling, 5 th Grade	St Patrick	Which Boat Holds More Weight?
2 nd place, \$25	Travis Burnard, 6 th Grade	Lial Catholic School	What Is The Effect Of The pH Of A Solution On Electrical Resistance?
2 nd place, \$25	Makenna (5 th) & Peyton (7 th) Hoffman	Trinity Lutheran	Stain Removers
2 nd place, \$25	Christopher Ferguson, 10 th Grade	Tinora High School	Optimizing Helicopter Flight

Lunch Hour Lecture on NASA’s Electric Aircraft Propulsion Vehicle Technology

A successful, information-laden presentation was held in the OAI President’s room on Tuesday, April 24th, from noon to shortly after 1:00 pm. The presenter was Dr. Rodger Dyson, currently serving as the NASA GRC technical lead for “Hybrid Gas-Electric Propulsion.” The title of the talk was “Electric Aircraft Propulsion Vehicle Technology - Development and Status.” About 25 members from the AIAA, NASA, and the Greater Cleveland community assembled to listen to this informative presentation and participate in the Q&A period following the talk.



Dr. Rodger Dyson discussing hybrid gas-electric propulsion technology.

After a brief introduction by AIAA NOS Council member, Al Juhasz, the speaker began the presentation with an explanation of the term “Hybrid Electric Propulsion.” Dr. Dyson then described the class of aircraft vehicles that can use various configurations of this technology, ranging from *Unmanned Aerial Systems (UAS)* to *Regional Jet, Blended Wing Body*, and *Truss-Braced Wing Body* systems, for small-to-mid size implementations, to larger *Turbo-Electric Distributed Propulsion*. While the former can use battery, or fuel cell power for their electric demands, the larger “turbo-electric” systems employ turbine driven generators, with gas turbines driving both the air compressor and a generator to supply “high-efficiency electric power” to propeller, fan, or cryo-cooler drive motors via a “power distribution network.” Dr. Dyson eloquently stressed the need for designs that optimize the proper balance between *power, propulsion, thermal management, and air-frame structural integration*, and emphasized these criteria throughout this informative presentation.

NOS Participates in AIAA/OAI Business Networking Event

On April 4th, AIAA HQ and the Ohio Aerospace Institute (OAI) hosted “Beyond B2B: Connecting for Growth,” at the Holiday Inn in Independence. The fast-paced event helped initiate collaboration among startups/small businesses and big business. The all-day networking event was an effective business-to-business matchmaking/networking program that connected entrepreneurs and small businesses from a wide range of industries, including those from outside the aerospace industry, with medium and large aerospace and defense companies. Several universities also participated. The event was led by Tom Irvine from AIAA HQ in Reston, VA. Tom, who worked at NASA Glenn from 1982 – 2004, is the former Deputy Associate Administrator for the Aeronautics Research Mission Directorate at NASA HQ. A total of 78 people representing 57 different organizations participated.



Troy Crawford (Crawford & Associates Services) and Chris Pestak (NOS) discuss the value of AIAA membership at the Beyond B2B event.

As part of new member recruitment efforts, the Northern Ohio Section had a display table at the event, which garnered plenty of traffic, especially from small businesses looking to expand their professional network.



AIAA NOS sponsored a table where handouts and merchandise were made available and NOS hats and mugs were raffled off.

2018 Cleveland Auto Show, Dinner & Lecture

On February 26th, the Society of Automotive Engineers (SAE), in partnership with AIAA Northern Ohio Section and other organizations, hosted a dinner event at the 2018 Cleveland Auto Show with a lecture on "The Evolution and Future of Automated Driving." The lecture was given by Dr. Bharat Balasubramanian who had spent nearly 40 years with Mercedes-Benz.



Dr. Bharat Balasubramanian at the 2018 Cleveland Auto Show.

His talk focused on the history of automated driving and where the industry is heading. He showed how systems evolved from being reactive, where the system adjusts based on user input, such as ABS brakes, to systems that are proactive, such as automated braking, where the system adjusts based on input from various sensors with or without user input. Dr. Balasubramanian discussed the approaches that different industry leaders, such as Uber, Tesla and Mercedes-Benz are taking. The pros and cons of certain technologies used in autonomous cars were also laid out.

On display was a new Mercedes-Benz E-class vehicle equipped with autonomous capabilities. Dr. Balasubramanian finished the lecture with a few words of optimism as well as caution. He envisions a future in which car accidents will be reduced tremendously due to the advancements of autonomous driving, but cautioned that safety should always be considered above all else, and should be the driving force towards the advancement of these systems.

Upcoming Section Events

- June 7, 2018 Distinguished Lecture: "To the STARS! From SEEING to BEING" by Dr. Robert Fugate
5:30 - 7:00 pm, Main Auditorium
Ohio Aerospace Institute, 22800 Cedar Point Road, Cleveland, OH 44142
Register at: [Fugate Lecture Registration](#)
- June 20, 2018 Lunch Hour Lecture: "Kilo-Power - Nuclear Power System with Stirling Energy Conversion" by Max Chaiken, NASA Glenn
noon - 1:00 pm, The President's Room
Ohio Aerospace Institute, 22800 Cedar Point Road, Cleveland, OH 44142
Free to attend and no registration required
- June 22, 2018 Annual Baseball Game Outing - Cleveland Indians vs Detroit Tigers at Progressive Field
Sold Out!



A beautiful Mercedes-Benz E-class vehicle equipped with autonomous capabilities was on display at the 2018 Cleveland Auto Show.

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