AIAA FREQUENT FLYER
American Institute of Aeronautics and Astronautics
Northern Ohio Section
Newsletter - March 2020

Dear NOS Section,

I almost don't know how to start this message to you. Living through a pandemic is something that I think most of us never imagined we would have to do. Each family/community is adapting rapidly to a new normal that seemed like a distant alternate reality only a month ago. While we as a section are used to seeing each other in person, I'm pleased that we've moved to all virtual for the health and safety of our members. We will continue to function to the best of our ability virtually for the foreseeable future. We are doing the best we can to be creative and to continue to provide value to our membership within the constraints of our new normal. If you have any ideas, suggestions, or feedback, please do not hesitate to reach out to me at aiaanos.chair@gmail.com. Also, please feel free to engage with us on our Section's Community page on the AIAA Engage site or on our social media platforms. Thanks for your understanding and continued support. Stay safe.

Christie
AIAA Northern Ohio Section Chair

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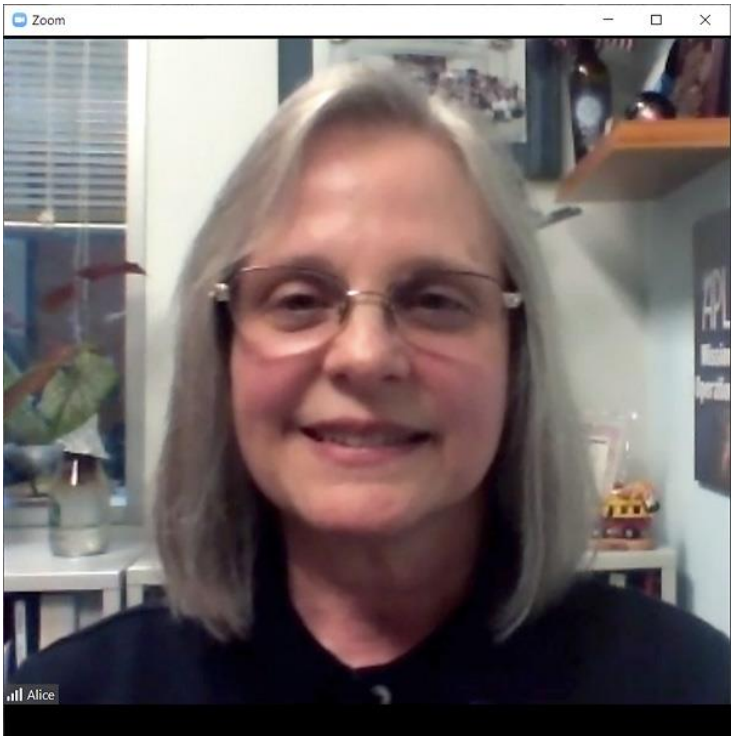
The Northern Ohio Section Live Streams Distinguished Lecture for the First Time

For the very first time, the Northern Ohio Section (NOS) of the American Institute of Aeronautics and Astronautics (AIAA) completed a live stream of the organization's Distinguished Lecture series on March 25, 2020. The virtual lecture was held online via the Zoom web conferencing platform and was attended by 37 Section members. Alice Bowman, who serves as the Space Mission Operations Group supervisor and the NASA New Horizons Mission Operations Manager (MOM) from the Johns Hopkins Applied Physics Laboratory, gave the lecture on "Mission to Pluto and the Kuiper Belt." Ms. Bowman supervises approximately 50 staff members who operate deep space and Earth-orbiting spacecraft, including NASA's TIMED, STEREO, New Horizons, and Parker Solar Probe. As the New Horizons MOM, Ms. Bowman leads the team that controls the spacecraft that made a historic flyby of the Pluto system in July 2015.

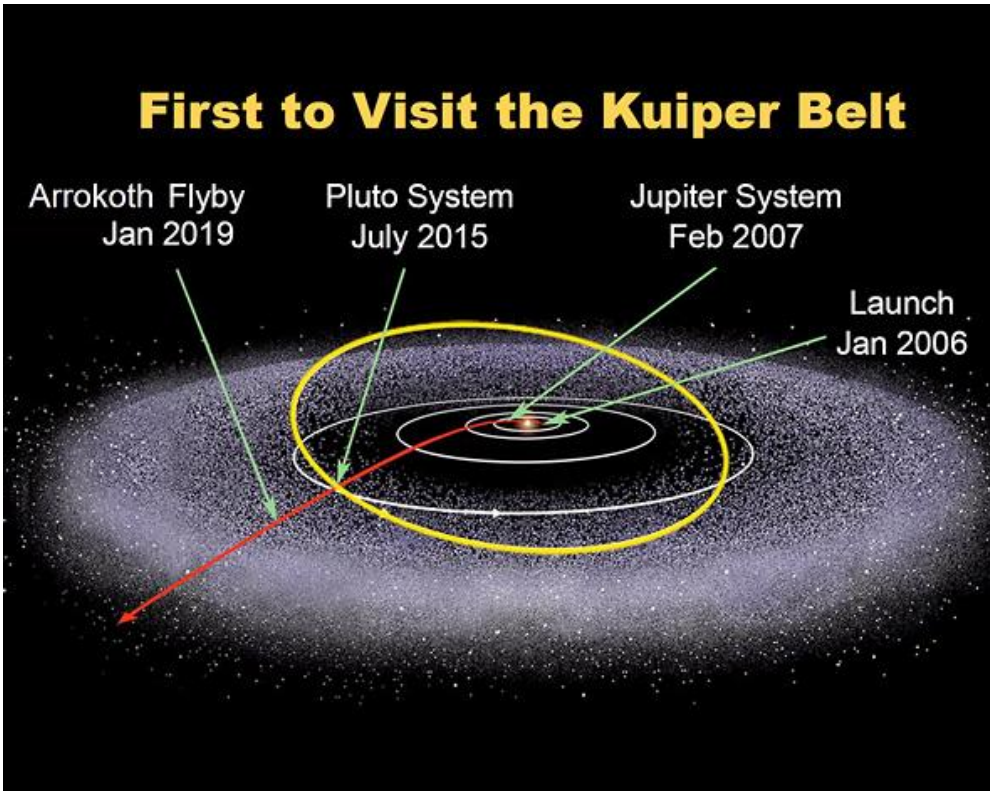
The lecture covered the voyage of NASA's historic mission to Pluto and the Kuiper Belt, which culminated with the first flight past the distant dwarf planet on July 14, 2015 and the first encounter with a Kuiper Belt object (KBO) on January 1,



2019. She spoke about the New Horizons spacecraft's continuing journey through the eyes of the mission operations team and described some of the technical, scientific, and personal challenges of piloting the spacecraft across the solar system on its voyage to the farthest reaches of the planetary frontier.

Due to the success of this first virtual Distinguished Lecture, AIAA NOS is planning more such events in the future. Please stay tuned for information on the next lecture, which will take place on April 23, 2020 at 5:00 pm, and feature "Anatomy of an In-Flight Breakup" by Dr. Robert Winn, who serves as Principal Emeritus at Engineering Systems, Inc.

(Text: Joe Connolly, Screen captures courtesy of April Bowman)



Youngstown State Branch Hosts 3D-Printed Glider Competition

The AIAA student branch at Youngstown State University (YSU) hosted its first 3D-Printed Glider Competition for the campus community on February 1, 2020. An estimated 50 undergraduate students and faculty participated in the event held at the university's Watson and Tressel Training Site (WATTS) indoor fieldhouse.

Intended to draw students from across disciplines to engage in the creative process of design, the AIAA-YSU student officers organized the competition to effectively combine the science of flight with "design for additive manufacturing," which considers the process by which parts are produced to reduce weight and component count. In addition to recognizing the importance of additive manufacturing technology in the aerospace field, the competition served as a fundraiser and AIAA national member recruitment event for the YSU student branch. Local news outlets attended the event, which was also featured in the AIAA Daily Launch bulletin on February 3, 2020.

Each team of up to three students paid a small entry fee for the chance to win cash prizes for longest time of flight and a 3D-printed trophy for most creative design. YSU students receive up to 500 grams of free 3D prints per semester in the campus Launch Lab, a maker space that supports learning experiences in digital manufacturing technologies for art, business, and STEM disciplines.

David Irwin, chair of the YSU branch and a senior in mechanical engineering, emphasized the importance of the event to the branch: "Executing a large-scale event like this is incredibly beneficial to our AIAA branch at YSU. This will not only provide the branch with an annual, signature event, but also be something that future branch officers can improve

AIAA-YSU 3D-Printed Glider Competition organizers and winning glider. From left: Cole Popichak (Branch Vice Chair), Eric Sullivan (winner), David Irwin (Branch Chair), and Vincent Haniford (Branch Secretary).

Second Place Winning Team, Mechanical Engineering students (left to right) Jane Casto, Megan McCloskey, and Erin Heaton.

upon. The world of 3D printing is growing, and having more events that make use of it is going to help expose more students to the process. We are grateful to the AIAA Northern Ohio Section Council for generously supporting prizes to aid the success of this inaugural event."

Dr. Kevin Disotell, assistant professor of mechanical engineering and faculty advisor for the AIAA-YSU branch, explained the origin of the idea. "This is the modern equivalent of a paper airplane competition, and the requirement to have 100% of the model be 3D-printed allows students to get hands-on experience with 'design for additive' in a fun way. They get to think about the parameter space and how to integrate the manufacturing process."

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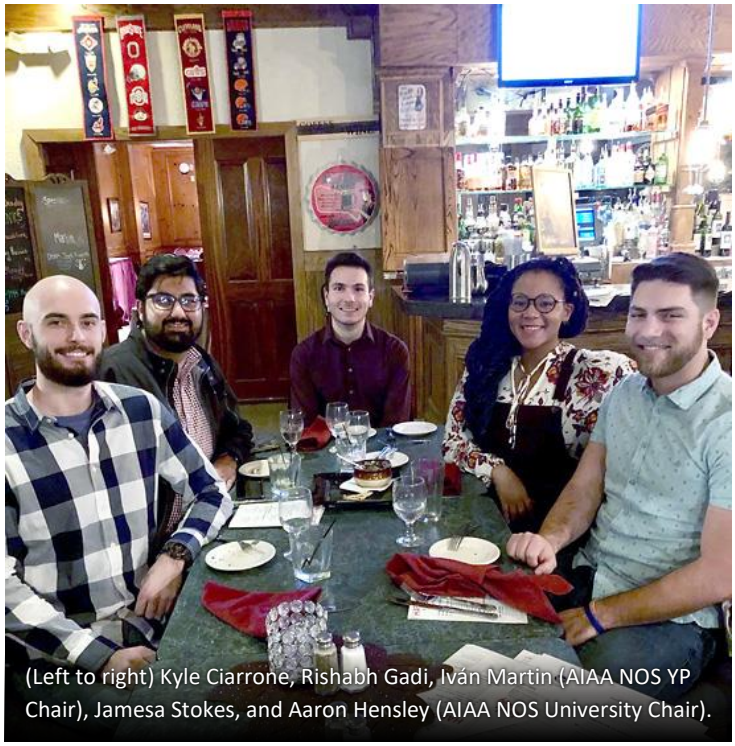
The event leveraged YSU's existing thrust as a national center for excellence in additive manufacturing (AM) and 3D-printing technology. As of 2019, YSU is one of just two universities in the world to own all seven additive manufacturing technologies in its Center for Innovation in Additive Manufacturing (CIAM). The university has received significant awards to support AM research, including a collaborative, $27 million federal project with America Makes, the National Additive Manufacturing Innovation Institute—of which YSU is a founding institutional member—and other partners to utilize AM for replacement of spare parts for aging Air Force aircraft. YSU also has received $7 million in special state capital allocations, as well as $3 million in federal funding, to establish the Excellence Training Center adjacent to campus—a workforce development, innovation and research hub focused on advanced manufacturing. The AIAA-YSU branch was established in 2017 to support student awareness of aerospace careers on campus in support of such initiatives.

(Text and photos: Dr. Kevin Disotell, Youngstown State University)

Young Professionals Social at the 100th Bomb Group

On November 22, 2019, Young Professionals from the AIAA Northern Ohio Section were invited to a social at The 100th Bomb Group restaurant overlooking the Cleveland Hopkins International Airport. Attendees enjoyed hors d'oeuvres and freebies courtesy of AIAA, as well as the general aviation-themed ambiance of the restaurant. Engaging discourse ensued coverering topics such as NASA's Artemis Program, current events including the Boeing 737 MAX aircraft grounding, AIAA's Design Build Fly competition, and the options available when pursuing higher education.

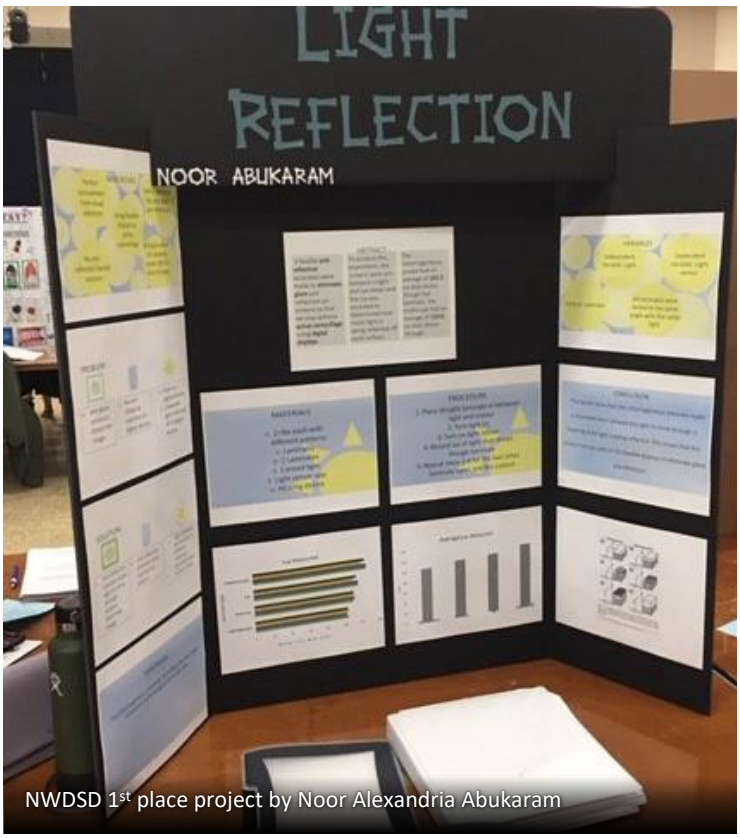
(Text and photo: Iván Martin)


(Left to right) Kyle Ciarrone, Rishabh Gadi, Iván Martin (AIAA NOS YP Chair), Jamesa Stokes, and Aaron Hensley (AIAA NOS University Chair).

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

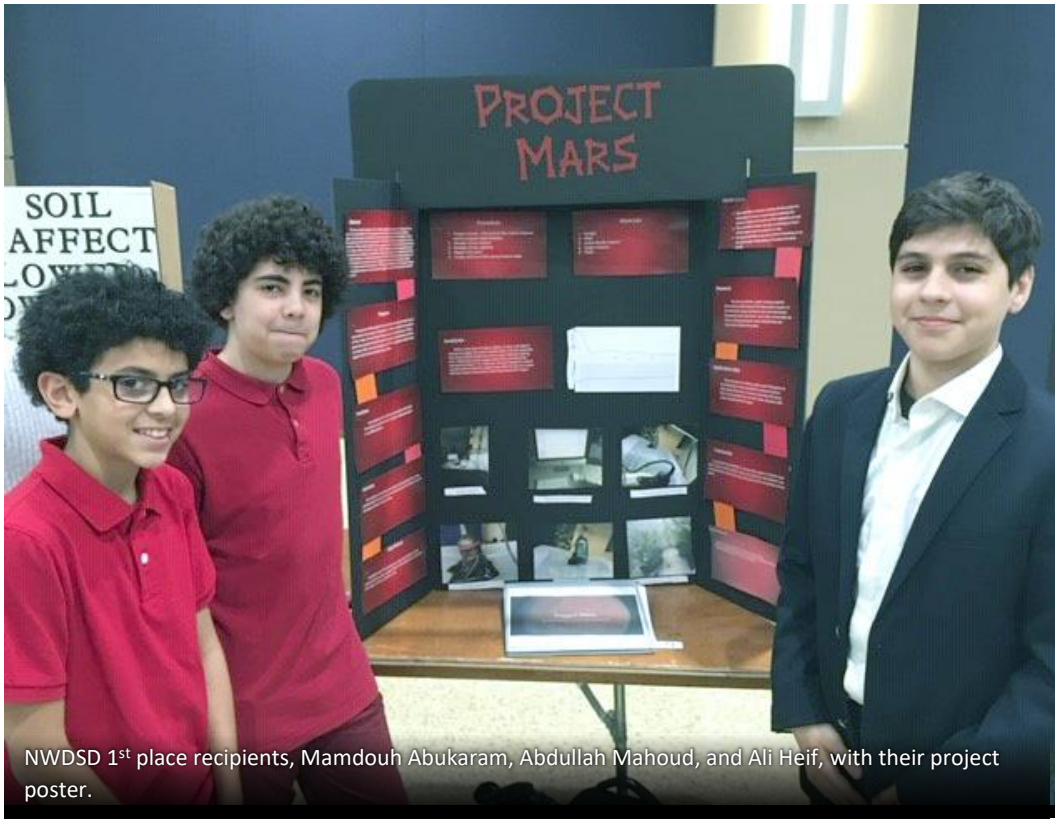
On March 7th, 2020, AIAA Northern Ohio Section (NOS) continued its support of two regional science fairs, by offering $200 in prizes for aerospace-related projects. Projects were judged by volunteer members of the section who gave their time to travel to the fair and provide encouragement to aspiring scientists, engineers, and inventors. In prior years, the section has sponsored awards at both the Northwest District 2 Science Day (NWDSD) and the Northeastern Ohio Science and Engineering Fair (NEOSEF). While the section was committed to participate at both fairs, NEOSEF was cancelled over the concern for the spread of coronavirus. NWDSD went on as planned and the section plans to continue its support of NEOSEF next year.

NWDSD was held at the University of Toledo student union on Saturday March 7th. Jonathan Kratz and David Friedlander of the NASA Glenn Research Center (GRC), drove from Cleveland that morning to judge the projects. There was over 115 total science projects on display. AIAA NOS judges evaluated science projects broadly related to aerospace engineering and related sciences. Two 1st place prizes and four runner-up prizes were awarded for a total of six prizes.



NWDSD 1st place project by Noor Alexandria Abukaram

Many students put together impressive projects and displayed plenty of knowledge, thought, passion, enthusiam and innovativeness with an aspiration to make a positive impact on the world around them. Particulary worthy of highlighting was: Noor Alexandria Abukaram's (Grade 11) project on reducing unwanted light reflection from the surface of a substance; and Mamdouh Abukaram (Grade 7), Abdullah Mahoud (Grade 8), and Ali Heif's (Grade 8) ambitious project to investigate how plants could be used to make Mars more habitable to humans.



NWDSD 1st place recipients, Mamdouh Abukaram, Abdullah Mahoud, and Ali Heif, with their project poster.

The winners are not just those who received the award but every student that sets out to make a difference through pursing their passion, every person who provides them with encouragement along the way, and all of us who will someday benefit from the work of these fine young people. For members wanting to give back to the STEM community, judging is a rewarding way to do so and we would be happy to have your help next year!

(Text and photos: Jonathan Kratz)

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Northwest District Science Day (NWDSD) Prize Winners

Prize	Name	School	Project
1st place, $50	Noor Alexandria Abukaram, 11th Grade	The Bounty Collegium	Reduction of Unwanted Light Reflection From the Surface of a Substance
1st place, $50	Mamdouh Abukaram, 7th Grade Abdullah Mahmoud, 8th Grade Ali Heif, 8th Grade	The Bounty Collegium	Project Mars
2nd place, $25	Delana Damman, 8th Grade Olivia Rossman, 8th Grade	Pettisville High School	The Effects of Magnetism on Radish and Peppermint Plant Growth
2nd place, $25	Reyan Shariff, 9th Grade Carson Mackey, 9th Grade	Ottawa Hills High School	Running App Accuracy
2nd place, $25	Aubrey Lawson, 8th Grade	Regina Coeli	How Much Energy Can Solar Panels Absorb from Colored Light?
2nd place, $25	Zane Alo, 6th Grade	Toledo Islamic Academy	Well Water Filtered through the Reverse Osmosis is the Safest for Drinking

Lunchtime Lecture with Dr. Umair Siddiqui

On Friday, January 31st, 2020, Dr. Umair Siddiqui, the Chief Technology Officer at Phase Four, presented an informative lecture entitled “Phase Four: Innovative Options for Small Sat Propulsion.” Dr. Siddiqui provided an overview of the company’s research and development of electrode-less Radio Frequency (RF) plasma thrusters, which draws from RF plasma physics knowledge outside of the traditional electric propulsion community, thus bringing unique new thruster capabilities to small satellites.

Phase Four’s concept utilizes radio wave heated plasmas, which allows for multiple propellants, and can fit on small satellites. Constellations of these small satellites are currently envisioned for a range of commercial use, including operations such as orbit transfer and station keeping. As the use of these small satellites increases, so too will the need for smaller propulsion subsystems. Increasingly, electric (plasma) propulsion is being considered; however, thrusters at the power level and size amenable to small satellites are still at the development stage. Dr. Siddiqui provided details of Phase Four’s approach to this market, and described the Maxwell thruster currently offered.

(Text: Edmond Wong, photos: Jim Gilland)

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

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