2020 PNW AIAA TECHNICAL SYMPOSIUM

ADAPTING TO THE MODERN AGE OF AEROSPACE

NOV 7, 2020

EVENT BEGINS
8:00 AM PST

PRESENTED VIRTUALLY ON

crowdcast

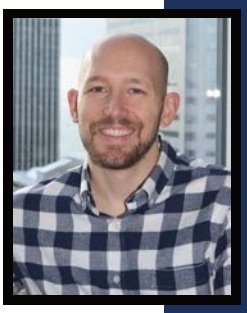
TABLE OF CONTENTS

WELCOME TO OUR 14TH ANNUAL TECHNICAL SYMPOSIUM

PRESENTED BY THE PNW AIAA CHAPTER

This year's symposium will focus on modernizing the industry while leveraging the past experiences of the industry. It contains 6 technical presentations, 4 keynote speakers from leaders of the aerospace industry, exciting company presentations, and a track for students and young professionals to gain insight on the experiences and tips from successful industry employees.

CRISTIAN ROMERO
Symposium Chair

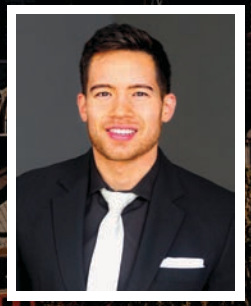


JOHN DIXON
Symposium Chair

STEVEN MAA
Sponsorship Chair

MELANIE KWONG
Planning Committee

ASTHA TIWARI
Planning Committee



PAUL TOMKO
Planning Committee

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AEROJET ROCKETDYNE

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BLUE ORIGIN

Trivia Activity Sponsor

THE MUSEUM OF FLIGHT

2020 PROGRAM SCHEDULE

EVENT BEGINS 8:00 AM PST

WELCOME COMMENTS | 8:00 - 8:10 AM

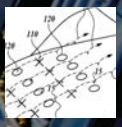
The Future of the Final Frontier
Ron Hobbs - NASA Solar System Ambassador
Opening Keynote 8:10 - 9:05 AM

BREAK/TRIVIA #1 | 9:05 - 9:10 AM

Modeling Simulation Best Practices to Help Fight COVID-19
Swati Saxena | 9:10 AM

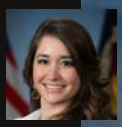
Design and Architecture of Mars Curiosity Rover
Greg Magone | 9:10 AM

Building Your Personal Board of Directors
Lorena Soriano | 9:40 AM



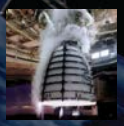
Research and Application of Active Vortex Control | Giovanni Nino
Robert Breidenthal | 9:40 AM

BREAK/TRIVIA #2 | 10:05 - 10:10 AM



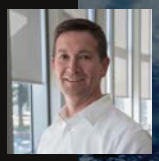
A Materials Engineer's Journey to Support the Lunar Gateway Station
Alma Stephanie Tapia
NASA | 10:10 AM

The Psychological Implications of Settling on Mars
Nicole Chase | 10:10 AM



NASA's Artemis Program Enabled by Aerojet Rocketdyne Propulsion
David Krismer | 10:40 AM

BREAK/TRIVIA #3 | 11:10 - 11:15 AM



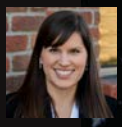
Revolutionizing International Business Jet Travel at Supersonic Speeds
Tom Vice - CEO Aerion Supersonic
Main Keynote 11:15 AM - 12:15 PM

LUNCH BREAK | 12:15 - 12:30 PM

Boeing's Confidence Travel Initiative
Joshua Cummins | 12:30 PM

Numerical Study of Percussive Riveting
Sai Krovvidi | 12:30 PM

In Space Transportation
Starfish Aerospace
Trevor Bennett | 1:00 PM



Acing the Interview
Gina Baker | 1:30 PM

Blue Origin Company Product Presentation
Heather Nelson | 1:30 PM

Crane Aerospace Company Product Presentation
Rodney Mack | 2:00 PM

BREAK/TRIVIA #4 | 2:30 - 2:35 PM

Celebrate ISS at Twenty
Geoff Nunn - Adjunct Curator for Space History, Museum of Flight
Closing Keynote 2:35 - 3:30 PM

CLOSING COMMENTS | 3:30 - 3:45 PM

Blue Origin was founded in 2000 by Jeff Bezos with the vision to enable a future where millions of people are living and working in space to benefit Earth. Blue believes we must protect Earth by moving heavy industries that stress our planet into space, and enable humanity to access space to expand, explore, and find new energy and material resources. To enable this future, we must build a road to space to lower the cost of getting there. Blue is working on this today by developing operationally reusable launch vehicles that are safe, reliable and highly available. Every launch vehicle is designed for human spaceflight from the beginning and able to ferry payloads to space.

Crane Aerospace & Electronics provides reliable, precision technologies that drive advanced capabilities for our commercial aviation, space and defense customers. Through innovative design, we deliver proven systems, reliable components and flexible power solutions that excel in tough environments – from engines and landing gear to satellites, missiles and avionics.

OPENING KEYNOTE

THE FUTURE OF THE FINAL FRONTIER

Ron Hobbs

NASA/JPL Solar System Ambassador

Abstract: As we continue to celebrate the golden anniversaries of the Apollo Moon landings, a new Space Age is taking shape. The exploration of space is now a global phenomenon, with many new players, both nation-states and private industry participating. NASA has a goal of sending the first woman and the next man to the Moon by 2024. This talk will review some recent events and hint at what is to come.

Biography: As a young man, Ron wanted to go to Mars. When that turned out to be unlikely he began exploring the planet of his birth, hiking and climbing the mountains of North America. He never lost his interest in the other worlds of the Solar System however, and in 2000 he discovered that NASA was recruiting enthusiastic volunteers to share the excitement of space exploration with the general public. Ron has been a Solar System Ambassador by NASA's Jet Propulsion Laboratory since 2001. That led to volunteering and then working for the Museum of Flight in Seattle, hosting astronauts, astronomers and planetary scientists for Public Programs. Currently, Ron teaches classes for Bellevue College's TELOS Retiree Education program and for other retiree education venues, as well as volunteering for the Museum of Flight.

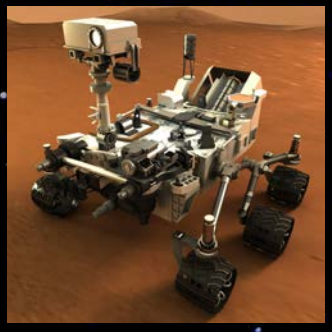
MODELING SIMULATION BEST PRACTICES TO HELP FIGHT COVID-19

Presenter: Swati Saxena, Ansys Inc.

Abstract: Since the outbreak of COVID-19, significant work has been done in identifying the best measures to prevent the spread of the virus. These studies are even more crucial for the airline industry as they strive to rebuild people's confidence in air travel. The effectiveness of Personal Protective Equipment (PPE), disinfecting techniques, social distancing, and medical treatments (for example ventilators and drug delivery) are critical to fight with this kind of infectious disease.Simulation has greatly impacted and accelerated the R&D work in these areas. Multiscale, Multidomain and Multiphysics simulations from the cell to the system are required to accurately simulate the behaviors. This presentation will highlight, with the help of real-world examples, how Ansys solutions can deliver the required capabilities to perform physics based simulation of PPE effectiveness, phenomena like coughing and sneezing, functioning of a ventilator, UV disinfection mechanism, ventilation and vaccine mixing.

DESIGN AND ARCHITECTURE OF THE MARS CURIOSITY ROVER

Presenter: Greg Magone, Flight Test Engineer, The Boeing Company



Abstract: This presentation discusses the architecture and the design of the 2011 Mars Curiosity Rover, the much beloved remote-controlled vehicle that roams the surface of Mars performing science experiments and looking for signs of ancient life. The Mars Curiosity rover was launched in 2009 and started collecting data on the Martian surface in January 2011. The Mars curiosity Rover was intended to be a mobile science laboratory to study the geological features on the Martian surface. Its purpose was to look for indications of past or present microbial life. This presentation discusses the architecture and design process that led to the successful Mars Curiosity Rover Mission.

Biography: Greg is a Boeing Flight Test Engineer. At work, he designs, installs, operates, and maintains the onboard data acquisition system on new models of aircraft. The data acquisition systems collect technical aircraft performance data used to demonstrate the aircraft meets regulatory requirements. Greg holds a Master of Science in Mechanical Engineering from the University of Washington and a Bachelor of Science in Mechanical Engineering Technology from Montana State University.

BUILDING YOUR PERSONAL BOARD OF DIRECTORS

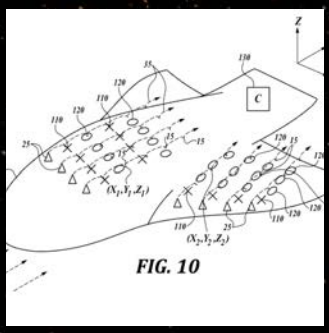
Presenter: Lorena Soriano, Co-Founder/CEO, every Point One, PBC

Abstract: Have you heard, “Relationships are the true currency” or your “network is your net worth”?COVID changed the game for in-person events and networking. Now more than ever we need to lean on our Personal Board of Directors to help us through accomplishing our goals and dreams. But what is a Personal Board of Directors and how do we form one?In this presentation you will learn the six crucial positions that every individual needs to have in their personal board, how to communicate that you’d like to “recruit” them for your board, maintaining the board, and hiring, firing and promoting them accordingly.A personal board will help you in finishing school, entering the workforce, negotiating your salary, receiving promotions, starting your own business and so much more. Thanks to technology you no longer have to be a legacy kid or have attended a top tier school to have those same opportunities or introductions.

Biography: Lorena is the founder and CEO of every POINT ONE where she believes Every .1% matters when you’re changing the stats to ensure we all have an inclusive and equitable future in STEM.Lorena is a community leader, Keynote Speaker, Forbes Fellow, 3x Founder and ardently supports those changing the world.A believer in "following your dreams and passions", Lorena left corporate America to pursue her own childhood dream of becoming a scientist and doctor. While completing her B.S. in Biochemistry she experienced the same problem she had as a child - lack of representation. This inspired her to create every POINT ONE, where she works with organizations to create STEM products that represent the population.Lorena actively shares behind the scenes as she’s building a business, participating in 2 Microsoft for Startup Accelerators and completing her graduate studies in Corporate Sustainability on her Instagram @girlchangetheworld

RESEARCH AND APPLICATION OF ACTIVE VORTEX CONTROL

Presenters: Giovanni Nino and Robert Breidenthal



Abstract: On this talk, we will present some of the work on active vortex flow control for aerospace applications being performed at the Astronautics and Aeronautics Department at UW. This includes plasma actuators, printed electronics, modified vortex generators, wind tunnel testing, and even a method for fire extinguishers in space.

PAINE FIELD
SNOHOMISH COUNTY AIRPORT

"Our mission is to contribute to the economic vitality and quality of life of the region. We do this by providing high-quality aviation and industrial services, facilities, and interaction with our customers. Our customers are the airfield tenants and users, our neighbors, the people of Snohomish County, and the worldwide aviation community.
- Arif R. Ghouse | Airport Director

Ed Wells Partnership

Mission

The Ed Wells Partnership provides discretionary training and career development resources for SPEEA-represented employees to enhance their technical and professional skills.

Enhance YOUR Career

Participants can choose from technical & professional classes, EWP Live! webinars, book clubs, career coaching and Local Learning events - such as this symposium!

RISING LEADERS KEYNOTE

A MATERIALS ENGINEER'S JOURNEY TO SUPPORT THE LUNAR GATEWAY STATION

Alma Stephanie Tapia

M&P System Manager,
NASA Lunar Gateway

Abstract: Alma Stephanie Tapia will share her career journey and provide insight on how the new NASA lunar Gateway program is helping take old space into the new space era. As individuals we must leverage our personal experiences to adapt in our careers and to the ever changing aerospace field. NASA's Lunar Gateway program is an example of how over 60 years of space exploration is being paired with new developments, new technologies, and new partnerships to help take humanity back to the moon and beyond.

Biography: Alma Stephanie Tapia was born and raised in El Paso, Texas. Alma Stephanie attended The University of Texas at El Paso to study Metallurgical and Materials Engineering and went on to complete her master of science in Materials Science and Engineering at the University of Florida. In 2005, Alma Stephanie started her career as a Material and Processes (M&P) Engineer at the NASA Johnson Space Center where she supported failure analysis and problem resolution for the Shuttle program and crew training aircraft fleet. In 2010, Alma Stephanie went on to oversee the maintenance of M&P systems for Space Suits and Extravehicular Activity tools/hardware. In 2013, Alma Stephanie also supported the M&P Bigelow Expandable Activity Module Inflatable Structures build, certification, and integration efforts for the International Space Station. In 2017, Alma Stephanie started to support contamination control and thermal vacuum testing for the Orion program. More recently in 2019, Alma Stephanie has taken on the Material and Processes (M&P) System Manager role for the design and oversight of the Lunar Gateway, including the subsystem management of the Habitation and Logistics Outpost (HALO). All these roles help provide technical expertise and oversight to NASA human space flight programs in the areas of material design, processes, certification, and failure analysis. Understanding material design and failure modes aids in the development and safe operation of vehicles that allow NASA to successfully expand human knowledge of the atmosphere and space. Alma Stephanie is also active in organizational and educational activities, participating in women, minority, and student outreach such as the NASA Hispanic Employee Resource Group (HERG) where the group's work was recognized by the president at the White House in 2015. All of these opportunities have enabled Alma Stephanie to be a contributor to NASA's commitment to space exploration and work within a One-NASA environment.

THE PSYCHOLOGICAL AND PHYSIOLOGICAL IMPLICATIONS OF SETTLING ON MARS

Presenter: Nicole Chase, Director of Projects, SEDS

Abstract: Not only will the journey to and the process of establishing a base on Mars be challenging from an engineering perspective, but, it will also be challenging from a space medicine perspective. This study hopes to give some more discussion into how the brain and body changes both during the trip to Mars and once the brain and body are on Mars. Using data collected from numerous analog astronauts, this study will create a data model to help predict (or otherwise forecast) what future astronauts might experience psychologically and physiologically during the flight to Mars and once on Mars.

Biography: Nicole Chase is the current Director of Projects for SEDS-USA. They have received a BS inNeuroscience and a BA in Geography from Bowling Green State University and a GISGraduate Certificate from Portland State University. Some of their selected research interests include space medicine, life support technologies, ensuring space is for everyone, and planetary atmospheres. They've recently presented at The Mars Society's annual convention and will be presenting at the forthcoming ASCEND 2020 conference.

AEROJET ROCKETDYNE IN-SPACE PROPULSION FOR NASA'S ARTEMIS PROGRAM: PAST, PRESENT, AND FUTURE DEVELOPMENT

Presenter: David Krismer, Principal Engineer/Program Chief Engineer, NASA Orion Programs – Aerojet Rocketdyne

Abstract: America has entered a new era of exploration. NASA's Artemis program will lead humanity forward to the Moon and prepare us for the next giant leap, the exploration of Mars. The foundation for our return to the Moon is NASA's deep space transportation architecture: the Orion spacecraft, the Space Launch System (SLS) rocket, the Gateway lunar orbiting outpost, and the Human Landing System (HLS). The Orion spacecraft, specifically designed for deep space human operations, will support up to four crew members. The SLS rocket is the human rated heavy-lift rocket designed to launch Orion, send it on missions to the Moon and support further deep space exploration and science. The Gateway spacecraft will provide a lunar orbit destination for crew habitat and transfer station between the Orion transportation spacecraft and the Human Landing System (HLS). Aerojet Rocketdyne provides numerous propulsion elements for the Artemis space and launch vehicles. AR provides the reliable, flight-proven RS-25 and RL10 rocket engines for the core and upper stage of the SLS that carry Orion into orbit and on to deep space. Orion contains 21 AR rocket engines on the Orion crew and service modules, and the jettison motor for Orion's Launch Abort System. The Gateway spacecraft's Solar Electrical Propulsion (SEP) system is three times more powerful than current electric propulsion systems and provides Gateway with highly efficient delta-V and attitude control capabilities. The HLS vehicles include the powered descent element, the human rated ascent element, and the lunar orbit transfer element. This presentation will cover the specific propulsion hardware provided by Aerojet Rocketdyne for NASA's Artemis program and a brief overview of their flight heritage.

MAIN KEYNOTE

REVOLUTIONIZING INTERNATIONAL BUSINESS JET TRAVEL AT SUPERSONIC SPEEDS

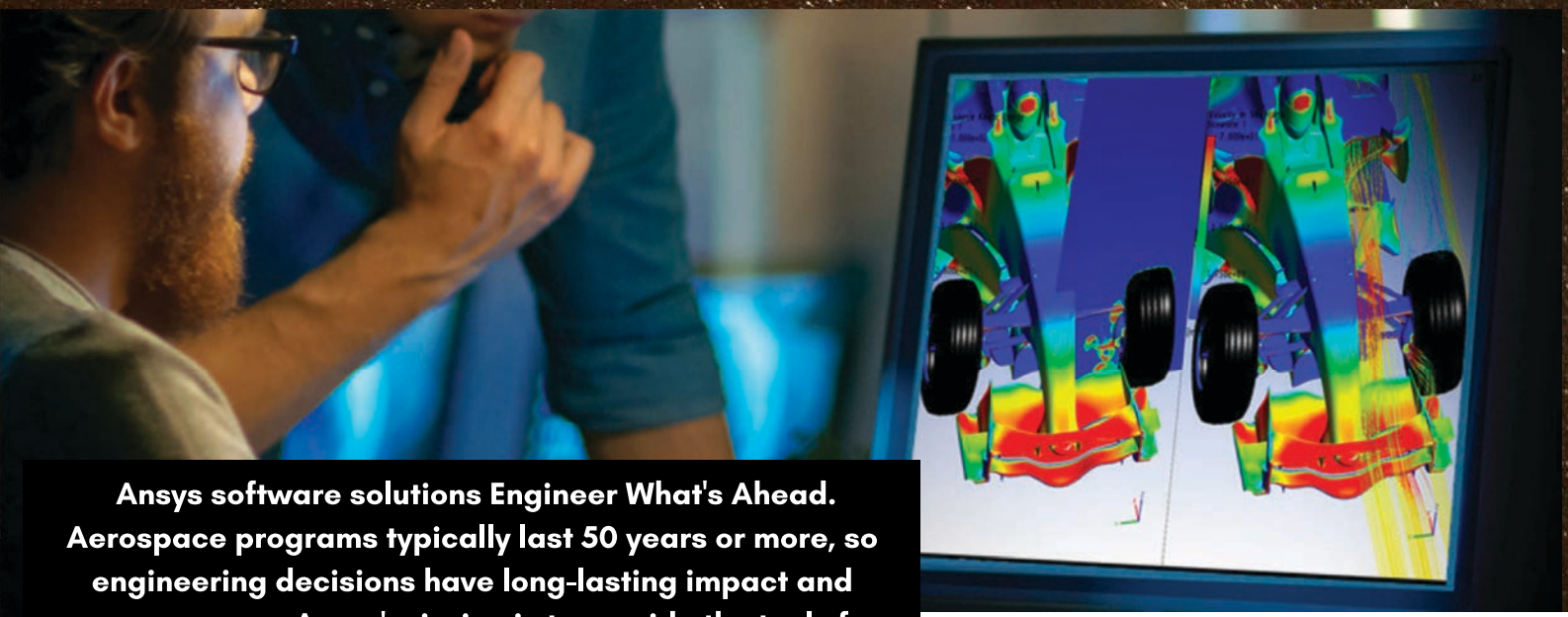
Tom Vice

CEO
Aerion Supersonic

Biography: Tom is the Chairman, President, and Chief Executive Officer of Aerion Corporation. Aerion is a leader in supersonic civil aircraft and advanced design software tools and technologies. Tom retired from Northrop Grumman after nearly 31 distinguished years of service with the company. He served as President of its Aerospace Systems sector, overseeing an $11 billion global advanced technology business with 23,000 employees. Aerospace Systems is a pioneer in space-based observatories, satellites, fully autonomous systems, combat aircraft, high-powered lasers, and microelectronics. Tom serves on the board of directors of the General Aviation Manufacturers Association (GAMA); the board of directors of Local Motors Industries, a technology-enabled manufacturer focus on mobility products; the board of councilors for USC's Viterbi School of Engineering; the board of advisors for Purdue University's School of Astronautics and Aeronautics; and previously served on the board of governors for the USO; the board of trustees for the Florida Institute of Technology; and the board of Smithsonian National Air and Space Museum.

AEROJET ROCKETDYNE Foundation

The Aerojet Rocketdyne Foundation's mission is to support the communities where the company has a business presence. The foundation's primary giving focus is education, with an emphasis on STEM - Science, Technology, Engineering and Mathematics. In 2020, the Aerojet Rocketdyne Foundation made contributions in 14 communities across the United States. Throughout the past twenty-one years, the foundation, with the help of many Aerojet Rocketdyne employees, has developed partnerships with many local K-12 schools, universities and nonprofit organizations. Since its inception in 1999, the Aerojet Rocketdyne Foundation has contributed more than $14 million to our local communities.



Ansys software solutions Engineer What's Ahead. Aerospace programs typically last 50 years or more, so engineering decisions have long-lasting impact and consequences. Ansys' mission is to provide the tools for engineers to create functional designs that perform reliably over their entire lifecycle. With Ansys, you can make critical decisions at the beginning of your programs with confidence and avoid recurring, expensive and unforeseen problems later - which can save lives.

Ansys

OVERVIEW OF THE BOEING CONFIDENT TRAVEL INITIATIVE

Presenter: Joshua Cummins, Probabilistic Analytics Team Lead, The Boeing Company

Abstract: Boeing launched the Confident Travel Initiative (or CTI) to lead in the global effort to provide passengers and crew a safe, healthy, and efficient travel experience. This includes working to minimize air travel health risks amid the COVID-19 pandemic, driving awareness of existing health safeguards, the cabin environment, cleaning, and disinfection process, and developing and testing new solutions.

Biography: As the Probabilistic Analytics Team Lead within Boeing's Confident Travel Initiative, Josh and his team have developed extensive models studying particle transmission in the aircraft cabin, analyzing probability and risk of transmission in the air travel system and are currently modeling the entire travel journey and screening strategies for air travel during the pandemic. Beyond the Confident Travel Initiative, Josh is an Integrated Vehicle Systems manager in Boeing Research and Technology where he leads Loads and Dynamics Engineers and Applied Physicists.

NUMERICAL STUDY OF PERCUSSIVE RIVETING PROCESS

Presenter: Sai Krovvidi, PhD Student, University of Washington

Abstract: The percussive riveting is implemented in the aerospace industry widely. Process characterizations has not been performed until now. It is essential to characterize this process because it exhibits nonlinearities due to contact constraints, high rivet deformation magnitude and time-dependent boundary conditions. Unlike quasistatic squeeze riveting, there is also thermal coupling involved. Numerical analysis is utilized because of the inherent nonlinearities to gain understanding pertaining to residual stress and strain distributions within an axisymmetric joint geometry. Effects of various geometric and process attributes on the deformation patterns will also be presented.

Biography: Sai Krovvidi is a Mechanical Engineering PhD student and teaching assistant at University of Washington, Seattle. He has worked in the PNW aerospace industry in aircraft and helicopter structural analysis projects and additive manufacturing projects. He has research experience in nonlinear, dynamic finite element analysis of aluminum -alloy aerospace assemblies.

IN SPACE TRANSPORTATION: PAST VISIONS, CURRENT PROGRESS, AND FUTURE MARKETS

Presenter: Trevor Bennett, PhD, Co-Founder Starfish Space

Abstract: Transportation in space is a keystone in building the off Earth economy. Spacecraft have largely relied on the combination of the rocket deployment to and onboard thrusters for any orbital maneuvering required. However, there is growing interest in using space tugs, or a connected independent vehicle with additional orbit maneuvering capability, to perform orbit insertion. Additionally, space tug technologies are considered essential for satellite servicing and large scale in-space industry. Space tugs are not a new concept; dating back to our early notions of spaceflight. This rich history in conceptualizing space tugs and the confluence of in-space tug development affords an exciting glimpse into our future space technologies and economies.

Biography: Dr. Trevor Bennett is the co-founder and CTO of Starfish Space, Inc. Starfish Space is building orbital transportation infrastructure for the new space revolution. The constellation of space tugs uses state-of-the-art autonomy software and robotics to provide on-demand transportation and station-keeping for spacecraft. B.S. in Aerospace Engineering from Texas A&M, PhD in Aerospace Engineering Sciences from University of Colorado, Boulder. Trevor's PhD thesis discussed guidance, navigation, and control (GNC) of a geostationary space tug using low-thrust propulsion for active debris removal. His work was recognized by NASA, NSF, AIAA, and Aviation Week. Prior to Starfish Space, Trevor designed and developed GNC software at NASA and more recently Blue Origin.

ACING THE INTERVIEW

Presenter: Gina Baker, Founder of Summit Connections

Biography: Gina Baker is the Founder & CEO of Summit Connections- a people consulting company. After a decade of supporting and developing those around her as a leader at the Disneyland Resort and Starbucks, she created her company with a simple philosophy in mind: teach others to be better at what they do so they can be happier with what they do. Gina works with leaders, teams, individual contributors, and small businesses to help achieve desired workplace goals through the most important avenue: our people.

BLUE ORIGIN COMPANY PRODUCT PRESENTATION

Presenter: Heather Nelson, Senior Management of University Relations at Blue Origin

Abstract: Join Heather Nelson, Senior Management of University Relations at Blue Origin, as she discusses the company's latest developments. Updated information on the company's space vehicles, rocket engines, and Human landing System will be shared. Students interested in opportunities at Blue are strongly encouraged to attend!

CRANE AEROSPACE AND ELECTRONICS PRODUCT PRESENTATION

Presenter: Rodney Mack, Sr. Director, Business Development

Abstract: From supporting aircraft worldwide to next-generation defense systems and historic space missions with innovative components and systems, Crane Aerospace & Electronics designs, manufactures, and provides cutting-edge solutions its customers depend on.

CELEBRATE ISS AT TWENTY

Geoff Nunn

Adjunct Curator for Space History, Museum of Flight

Abstract: The first crew of astronauts arrived at the International Space Station 20 years ago, and since then, we have never had a day without someone living and working in space over our heads. Through ISS related artifacts and a 360 virtual tour, this talk celebrates one of the most ambitious examples of engineering and international cooperation ever undertaken.

Biography: Geoff Nunn leads the museum's efforts to tell the story of the first 50 years of human spaceflight and beyond. Geoff is responsible for the primary research and exhibit writing for all the museum's space-related exhibits. He also volunteers with NASA's Solar System Ambassadors program and represents The Museum of Flight as a member of several space history and policy groups. Geoff has presented on the Museum's efforts to tell the story of space at conferences nationwide, and also regularly writes about space-related topics.

The Museum of Flight is the largest independent, non-profit air and space museum in the world! With over 175 aircraft and spacecraft, tens of thousands of artifacts, millions of rare photographs, dozens of exhibits and experiences and a world-class library, the Museum and its people bring mankind's incredible history of flight to life.

THE
MUSEUM
OF FLIGHT