

12th Annual Pacific Northwest AIAA Technical Symposium

*Pacific Northwest Aerospace
Reaches for the Skies!*



Saturday, November 10th, 2018
Museum of Flight ♦ 9404 E Marginal Way S, Seattle, WA

<http://pnwaiaa.org/2018-technical-symposium>

Program at a Glance

Start time	Skyline Room	South View Lounge	North View Lounge
7:15 AM	Registration & Breakfast		
8:00 AM	Welcome		
8:15 AM	KEYNOTE: Towards Next-Generation Aerospace Design and Manufacturing (DARPA)		
9:15 AM	The Boeing Advanced Research Center at the University of Washington (UW)	Importance Of End-User Input For International Space Station Design Projects (former NASA)	Rising Leaders Keynote
9:45 AM	On the Far Wake and Induced Drag of Aircraft (Boeing)	State-of-the-Art of Smart Materials (Boeing)	
10:15 AM	Coffee Break		
10:30 AM	Shaping Our Future through STEM Outreach (Starfish Education)	Research on Design and Simulation of LEO CubeSat Constellation Control by Atmospheric Drag (UW)	Student poster session
11:00 AM	Startups		
12:00 PM	LUNCH		
12:30 PM	KEYNOTE: New Tools in Aircraft Accident Reconstruction		
1:30 PM	Go Fly Prize (Konopka)	Examination of the NOAA MADIS Aircraft Based Observation Dataset (Engility Corporation)	Speed Mentoring
2:00 PM	Microgravity Materials Joining Investigative Chamber (Ragan)	Failure Analysis of a Composite Amateur Rocket (Portland State)	
2:30 PM	Coffee Break		
2:45 PM	PANEL: Management vs Technical Career Path	Hardware Design and Implementation of the Landing Gear Control Algorithm (UTAS)	Resume workshop
3:15 PM		Optimizing HPC Service Delivery (Boeing)	
3:45 PM	KEYNOTE: Commercial Flight at Paine Field (Propeller Airports)		
4:15 PM	Closing Remarks by the Symposium Chair		
4:30 PM	Networking social		

Welcome

Welcome to the 12th edition of the Pacific Northwest AIAA Technical Symposium!

We have tried to compile an interesting program with presentations by aerospace professionals from our own region. Our keynote for the symposium is presented by Bob Winn, entitled “New Tools in Aircraft Accident Reconstruction.”



In the morning and afternoon, we will have two parallel sessions of technical presentations (Skyline Room and South View Lounge) and one room dedicated to the Rising Leaders Forum (North View Lounge).

The technical sessions, located in the Skyline Room and South View Lounge, cover a nice mix of aeronautical and astronautical topics from both industry and academia in our own region. We encourage everyone to ask questions after each presentation or talk with the presenters during the breaks. The Barnstormer Lounge can be used as a green room throughout the day.

The Rising Leaders Forum is designed for the industry’s young professionals (those less than 35 years of age), and will take place in the North View Lounge throughout the day. It will begin with a keynote given by Adam Wuerl of Blue Origin, followed by a student poster session, speed mentoring and a resume workshop.

During the day, the Skyline Room will host the three keynote presentations as well as the startup fast pitch featuring three new startup companies in the area.

Enjoy the program and feel free to provide feedback on how we can improve!

On behalf of the 2018 AIAA-PNW Technical Symposium Organizing Committee,



Agnes Blom-Schieber
2018 Symposium Co-Chair



Brent Pomeroy
2018 Symposium Co-Chair

Welcome

Agnes Blom-Schieber, 2018 Technical Symposium Co-Chair

KEYNOTE: Towards Next-Generation Aerospace Design and Manufacturing

*Dr. Jan Vandenbrande, Defense Sciences Office Program Manager
DARPA*

This talk will cover the topics that are being addressed by the DARPA FUN Design, TRADES and TFF programs:

- Conceptual design is largely an artisan activity that involves finding combinations of physical behaviors to achieve a desired function. Are there new ideas from physics, mathematics and computer science that could help us explore this space better?*
- There has been tremendous progress in architected materials and advanced manufacturing processes (e.g., 3D printing) over the last couple of decades. However, are we really leveraging these innovations and are we designing things any differently?*
- Carbon fiber reinforced composites are strong and lightweight materials that have given us many benefits. However, 50-80% of most composite aircraft are still made out of heavier metal, which means we are leaving potential performance on the table. Why is that and what can we do to change that?*

"The Boeing Advanced Research Center at the University of Washington"

*Prof. Santosh Devasia, Director of Boeing Advanced Research Center
University of Washington*

The Boeing Advanced Research Center (BARC) fosters collaborative basic and applied research, translational research and development, and student education-related activities in the area of manufacturing and assembly of aircraft and spacecraft structures. The BARC, started in fall, represents a new paradigm in the execution of industrial research at the University of Washington (UW). Boeing-employed affiliate instructors work in the lab side by side with faculty and students on joint research projects in the manufacturing and assembly of aircraft and spacecraft structures. Current research focus is on automation, robotics, mechatronics and metrology, with the focus on the assembly of aircrafts. Our goal is to foster: (i) collaborative basic and applied research; (ii) translational research and development, and (iii) student education-related activities. BARC is part of the UW College of Engineering's strategic research area of Engineering and Manufacturing, where the goals are to become research leaders in next-generation advanced manufacturing and strengthen the innovation ecosystem in the State of Washington and the nation. This presentation will discuss the advantages and lessons learned in building a collaborative approach to research and education between a major industry partner and a leading research university.

Importance of End-User Input for International Space Station Design

Leslie Pomeroy, NASA Johnson Space Center

Leslie Pomeroy has four years of experience as a Flight Controller for the International Space Station (ISS) at NASA's Johnson Space Center in Houston, TX. In her role, she supported ISS on-board communications and computer systems from Mission Control. As a CRONUS Flight Controller, she led projects for a new radio on-board the ISS to be used with visiting vehicles (such as the Boeing CST-100 and the SpaceX Dragon) and an emergency-communication response system for astronauts. After finishing her work at NASA, Leslie now works as an efficiency consultant for local non-profit organizations. She graduated with her B.S. in Mechanical Engineering in 2010 from Michigan Technological University.

RISING LEADERS KEYNOTE

A Contrarian View of Systems Engineering: New Twists on Best Practices

Adam Wuerl, Blue Origin

There's remarkable similarity in basic systems engineering fundamentals across a wide range of customers, budgets, and domains. Adam will share some observations on the discipline of systems engineering: at a 20-person company building its first space-flight hardware to the country's largest defense contractor; from small study contracts to billion-dollar programs; and from a "new space" minimum viable product approach to a customer only interested in 100% Mission Success.

He'll share some unconventional yet effective takes on these common best practices: requirements management and configuration control, the evolving role and place for collaborative tools like wikis, risk and opportunity management, gated reviews, peer reviews, and trade studies. There's no magic here, and an interesting idea that worked on one project with one team may be entirely inappropriate in another context, so he hopes to spur conversation and respectful disagreement in the Q&A.

On the Far Wake and Induced Drag of Aircraft

Dr. Philippe Spalart, Senior Technical Fellow, The Boeing Company

The fully rolled-up wake of an aircraft is studied within the incompressible and locally inviscid framework, using Matched Asymptotic Expansions. The Trefftz-plane assumption is not applied, and variations in total pressure due to parasite drag and propulsion are included. The force vector is fully accounted for, including both classical and small, apparently new terms.

The intriguing feature of the final result is that, although induced drag is widely understood to account for kinetic energy deposited in the atmosphere, we arrive at the integral of $\frac{1}{2} \rho (v^2 + w^2 - u^2)$, where the x axis is aligned with the wake. The unexpected negative sign of the u^2 term is ultimately explained by a flux of kinetic energy in the vortex core, towards the airplane, and depleting the region of the starting vortex. For a typical wing, its effect on drag does not exceed 0.1%. There appears to be no chance of ever making the induced drag negative.

State of the Art Materials

Dr. Tad Calkins, Associate Technical Fellow, The Boeing Company

Smart materials, such as Shape Memory Alloy (SMA), are an exciting new technology that holds the promise of revolutionary new capability for aerospace products. SMA is a metal that can be engineered to change shape on command, creating a solid-state, weight-efficient, uniquely integrated, distributed actuator. They enable designers to combine actuation, sensing, control, and structural integration functions into a single element, thus vastly reducing system complexity, cost, and mass. In addition SMAs foreshadow future developments in materials technology where great benefits are gained by taking advantage of non-linearities, multi-functionality, and controllable geometries and properties. A rich design space has been created by new alloys, actuator forms, fabrication methods and actuator operation. Boeing has combined this material capability with unique system solutions creating smart structure with exciting new capabilities for aircraft. This talk will delve into this unique technology and its current and potential use in aerospace and other industries, including the review of past demonstrators, wind tunnel tests, and flight tests of helicopter and airplane smart structure systems. These example applications point the way to the next generation of Smart Aircraft.

BREAK

10:30 – 11:00

Parallel Session

SKYLINE ROOM

Shaping Our Future through STEM Outreach

Lane Slagle, Founder/Director of Starfish Education

STEM Outreach is the cornerstone to building a rich STEM pipeline. By helping our students develop skills like critical thinking and problem solving, we help grow them as learners, leaders and future STEM professionals. Come learn ways that you can be a part of growing the STEM pipeline for a successful future!

10:30 – 11:00

Parallel Session

SOUTH VIEW LOUNGE

Research on Design and Simulation of LEO CubeSat Constellation Control by Atmospheric Drag

Jingyang Wu, University of Washington

Normally, atmospheric drag is considered as a perturbation in orbital mechanics, because it leads to the de-orbit of Low Earth Orbit satellites. However, for short-term CubeSat mission, it could be used as a substitution of thrust, which therefore could save both the total cost of the injection process and the payload space inside CubeSats. The philosophy of this plan is to change the mass-to-area ratio of the target CubeSats by adjusting their orientation twice (once as designed and once reverse), so that they would receive different atmospheric drag but still remain on the same altitude. Although this manipulation will reduce the life of those CubeSats, most short-term missions still benefits more from it, for this is able to cut down a lot of budget for large constellations, especially those consist of more than ten CubeSats.

10:30 – 12:00

Parallel Session

NORTH VIEW LOUNGE

Poster Session

Students from a number of clubs and groups from different universities will present their work and any significant findings. This will also give you an opportunity to connect with students and learn about their various projects, both in the classroom and out of the classroom.

Society for Advanced Rocket Propulsion

Autonomous Flight Systems Laboratory

Washington Superbike

North Seattle Community College Rocket Team

Advanced Composites team

Startup Pitches and Panel Discussion

Don Weidner, Moderator

We will hear from a number of small startup companies in the area. Each company will give a brief quick-pitch of their product and services. Following these presentations, a moderated panel discussion will focus on the rapidly changing, disruptive business climate of the aerospace industry. Company information is found later in this program.

Echodyne

<http://echodyne.com>

Space Entrepreneurs

<http://thespaceentrepreneurs.com>

Synchronous

<http://synchronous.us>

LUNCH***New Tools in Aircraft Accident Reconstruction***

*Dr. Bob Winn, Principal and Chairman of the Board
Engineering Systems, Inc. (ESI)*

An engineering approach to accident reconstruction really began approximately 40 years ago with Bach and Wingrove, who developed a technique for estimating aircraft performance using recorded radar data for NASA. Recent improvements in their approach will be explained. Flight data recorders have been used in airline accident analysis, but with the increased use of electronics in general aviation airplanes, flight data recorder quality information is often available. Examples of each of the new technologies will be presented and discussed, including CT scanners, Lidar, laser scanning of accident scenes, 3-D printing, the use of UAVs and virtual reality, and others.



1:30 – 2:00

Parallel Session

SKYLINE ROOM

Go Fly Prize

Teresa Konopka

The goal of the GoFly Prize is to foster the development of safe, quiet, ultra-compact, near-VTOL personal flying devices capable of flying twenty miles while carrying a single person. This would sound ridiculous if it were not for the \$2 Million that aerospace giant Boeing has put up to sponsor such a contest. In this presentation, attendees will learn about the contest rules, timeline, prize categories, and guidelines. They will also see the Phase I winners from all around the globe, who will be showcased in this presentation. Audience members will get a chance to chime in on their opinions of the Phase I winners, and even share how they would make their own flying machine.

1:30 – 2:00

Parallel Session

SOUTH VIEW LOUNGE

Examination of the NOAA MADIS Aircraft-Based Observation Dataset

Bob Robins, Engility Corporation

This talk summarizes an analysis conducted by the Volpe Center regarding aircraft-based observation (ABO) data from the National Oceanic and Atmospheric Administration (NOAA) MADIS (Meteorological Assimilation Data Ingest System). A series of validation or inter-comparison campaigns that include Eddy Dissipation Rate (EDR) and Brunt-Väisälä Frequency (BVF) are made between NOAA MADIS datasets and ground based remote sensing measurements to establish confidence in the ABO data for research application at en route altitudes. The NOAA MADIS ABO data are then used to estimate the statistical distributions of the meteorological quantities in the en route environment, restricted to the area covered by a subset of current commercial flights over the continental United States (CONUS).

1:30 – 2:30

Parallel Session

NORTH VIEW LOUNGE

Rising Leaders – Speed Mentoring

Take the opportunity to talk to some of the speakers and other experienced aerospace professionals; ask questions about their road to success, and discuss hot topics in aerospace one-on-one with industry leaders. Mentor biographies can be found on page 20.

Microgravity Materials Joining Investigative Chamber*Jimmy Ragan*

Melting and solidification are essential manufacturing processes. Procedures such as soldering, brazing and welding for fabrication and repair will likely be crucial to long duration or deep space missions. Unfortunately, these solidification processes are poorly understood in a microgravity environment. For example, conventional soldering techniques produced highly porous joints that are mechanically weaker and have worse electrical and thermal conductivity than their Earth equivalents. The prototype Microgravity Materials Joining Investigative Chamber (MMAJIC) is an ISS experimental module proposed to achieve a better understanding of these processes. An instrumented housing for processing experiments contained in ground prepared sample trays, it is designed to simply operate in the Maintenance Work Area. MMAJIC automates data acquisition and control through its internal microcontroller, both reducing the required crew input and maximizing sample throughput. By providing a large form factor and adaptive sample interfaces, a wide range of solidification/heating experiments can be conducted using investigator supplied trays within the same housing.

Failure Analysis of a Composite Amateur Rocket*Joseph Shields and Risto Rushford, Portland State University*

Traditional university-class amateur rockets use commercial, off-the-shelf phenolic tubing or fiberglass airframe design. Our organization, the Portland State Aerospace Society, decided to build our own carbon fiber composite airframe as part of a technology demonstrator for a 100-km rocket. We designed, built, and flew a novel modular airframe using wrapped carbon fiber with Nomex honeycomb and aluminum coupling rings. Dubbed Launch Vehicle 3 (LV3), the rocket was flown in in the summer of 2018 in the central Oregon desert.

BREAK

PANEL: Management vs. Technical Career Path

Priscilla Martinez (Moderator)

The Boeing Company

Gabriella Blackner

Janicki Industries

Lana Neyolova

Sine Draco Aviation

Dr. Rachell Ornan

The Boeing Company

Dr. Jan Vandenbrande

DARPA

Come join a discussion focused on the discussion of a technical versus a management career path. The panelists will give a brief summary of their professional background with a follow-up discussion. In addition to questions posed by the panelists, questions will be fielded by the audience.

Resume Workshop

Lisa Schleuter

The Boeing Company

Erinann Corrigan

Tencate Advanced Composites

This Resume Workshop is geared towards students and early career professionals who want to learn more about how to best represent themselves to a potential employer through a resume. We will spend some time talking about general advice for resumes and have time for Q&A with the presenters who have experience reviewing resumes. There will also be time for peer review and discussion on how to apply some of the new tips you've learned, so please bring your resume.

Hardware Design and Implementation of the Landing Gear Control Algorithm

Neno Novakovic, UTAS

Since the early 1970s, when microprocessors became commercially available, they quickly became a common part of all aircraft control and indication systems. With an ever-increasing number of microprocessor-based airborne applications, safety regulations and software standards like RTCA DO-178 evolved, demanding rigorous requirements and processes for software development, testing, life cycle, and certification. Over the years, as development of aerospace software applications increased, engineering costs of development and product certification costs exponentially increased, having a significant impact on the market.

Landing Gear Actuation system is one of many aircraft systems whose control functions are based on microprocessors and software application. Considering that Landing Gear Actuation control algorithm can be defined in a form of the State Machine, this presentation intends to demonstrate that such controller can be realized as wired logic hardware, without software implementation. Control algorithm and logic structures were defined based on generic aircraft Landing Gear Actuation system, which is common for many midsize commercial aircraft. A full functionality of the control algorithm was defined and simulated together with the initial conditions, power up recovery states, and reverse commands.

Optimizing High-Performance Computing (HPC) Service Delivery

Jim Glidewell, The Boeing Company

Access to High Performance Computing (HPC) resources has become an essential tool for many aerospace engineering disciplines. This presentation will provide an overview of how Boeing delivers HPC resources to engineers across the enterprise. After a brief look back at the history of HPC within Boeing, we will review the current HPC service, including both hardware and software technologies which enable our engineers to model problems beyond the limits of other available computing resources. We'll look briefly at the engineering disciplines using the HPC service today. We'll also examine both hardware and software involved in offering an HPC service, and the roles of servers, interconnect, storage, and remote visualization to provide a service that meets the needs of Boeing engineers. Finally, we take a quick look at challenges and prospects going forward at how we'll meet the needs for HPC in the future.

Commercial Flight at Paine Field

Brett Smith, CEO of Propeller Airports

The proposed, and presumably imminent, start of commercial air travel at Everett's Paine Field presents an exciting change in the industry. The airport, owned by Snohomish County, is located about 30 miles north of Seattle. The airport is home to the Boeing wide-body factory, and also hundreds of general aviation aircraft. For the first time in the US, a new, privately-delivered passenger terminal has been constructed. The speaker will present lessons learned through the construction process. He will also touch on goals and keys to being successful under the P3 structure.

Closing

Brent Pomeroy, 2018 Technical Symposium Co-Chair



We are enabling a new reach into deep space and inspiring the next generation of explorers to reach for the stars.

AEROJET
ROCKETDYNE

rocket.com

Keynote Speakers

Dr. Bob Winn



Dr. Winn is a mechanical/aeronautical engineer, Principal and Chairman of the Board of Engineering Systems Inc. (ESI). ESI provides a wide range of technical support capabilities, including metallurgical, materials, aeronautical, mechanical, structural, electrical, safety, automotive, and audio/visual services. He has been with ESI since 1994 and during that time has reconstructed hundreds of aircraft accidents. Dr. Winn retired from the U.S. Air Force in 1991 after a 22-year career. He was an instructor pilot in four different Air Force aircraft, taught aeronautical engineering at the USAF Academy, and served as Chief Scientist of the USAF European Office of Aerospace Research and Development in London, England. He is a Fellow of AIAA and a Fellow of the Royal Aeronautical Society. He has served as a member of the SAE AC-9C Subcommittee on Aircraft Icing Technology. Dr. Winn has directed research; published over 70 technical papers, technical reports, and articles; and has given numerous presentations on a wide variety of technical and educational topics.

[Keynote speaker, 12:30 PM, Skyline Room] [Mentor, 1:00 PM, Room 1A]

Dr. Jan Vandenbrande



Dr. Jan Vandenbrande is a program manager at DARPA's Defense Sciences Office where he oversees a comprehensive portfolio of programs to advance the state of the art of mechanical design, manufacturing and materials. Prior to DARPA, Dr. Vandenbrande was a Technical Fellow and Senior Manager of the Applied Math Geometry and Optimization group at Boeing where he created several software systems to change how products are designed and made. At Unigraphics, now Siemens NX, Dr. Vandenbrande worked on the architecture of the next generation Computer Aided Manufacturing system. He received his Ph.D. in Electrical Engineering from the University of Rochester for his work on machinable-feature recognition. For details, see FUN Design, TRADES, EQUiPS, MoDyL, MDP, OM, and TFF on DARPA's website.

**[Keynote speaker, 8:15 AM, Skyline Room] [Mentor, 1:30 PM, North View Lounge]
[Panel member, 2:45 PM, Skyline Room]**

Brett Smith



Brett founded Propeller in 2009 to bring public private partnerships to U.S. airports based on the successful model demonstrated at some of the most well run global airports. Brett also serves as Chairman of Vortex Control Technologies; a leading developer of innovative technologies that make aircraft safer and more efficient. Previously, he co-founded and served as Chairman & CEO of ei3 Corporation, a pioneer in remote monitoring technologies for large manufacturing companies. Prior to ei3, Brett was Director Development at Presstek. He has held positions in the areas of business development with Asia Times newspaper and Susquehanna International. Brett has served on the Board of ICAD (NASDAQ: ICAD) and on the boards of various organizations, including The United Way. Currently, Brett is a member of the NY Board of Human Rights Watch and serves as a Trustee for the Dublin School. A licensed private pilot, Brett graduated from Emory University.

[Keynote speaker, 3:45 PM, Skyline Room]

Technical vs. Management Panel Session

Priscilla Martinez
Moderator



Priscilla Martinez received a B.S. in Aerospace Engineering from Virginia Tech in May 2007 and relocated to Seattle soon after. Her first year at Boeing, she was an engine performance engineer in Propulsion Product Development. A year later, she joined the 787 Experimental Flight Test effort as a Ground Operations Engineer. In this role, she's been able to experience the manufacturing process for flight test installations and flight test conduct and processes. After about 3 years of flight test excitement, it was time to revisit Propulsion and joined the 787 Engine Controls group mainly working in the Propulsion Integration Lab (PIL) in Seattle. In March of 2014, she joined the 737MAX Engine Controls group, and currently works on the 777X Engine Controls group.

[Panel Moderator, 2:45 PM, Skyline Room]

Gabriella Blackner



Gabriella Blackner works as a Controls & Automation Engineer at Janicki Industries in Sedro-Woolley, Washington. Throughout her career in the aerospace industry, her core tenant in guiding her engineering adventure was to work on problems that are challenging and worthwhile. Gabriella started as a 787 Aircraft Mechanic at Boeing while earning her B.S. in Aerospace Engineering from the University of Washington, Seattle. She then worked as a Systems Engineer at Orbital Sciences, working to concept, test and launch GEO Communications Satellites. At Blue Origin, she worked as the Lead Systems Engineer to qualify the New Shepard Crew Capsule for Human Spaceflight while also earning her M.S. in Aerospace Engineering from University of Maryland, College Park.

[Panel member, 2:45 PM, Skyline Room] [Mentor, 1:30 PM, North View Lounge]

Lana Neyolova



Lana Neyolova is a Manager of Engineering and Sales at Sine Draco Aviation, where she balances engineering work with sales activities. In her engineering role she researches product configurations, performs decompression analysis, reviews structural analysis, etc. On the sales side Lana represents the company at trade shows and sets up meetings with potential customers. Prior to Sine Draco, Lana worked at LMI Aerospace and Boeing where she was responsible for planning, leading and tracking the progress of large-scale aircraft modifications. Lana was awarded a Master of Aerospace Engineering by Bauman University in Moscow, Russia, with a focus in rocket launch pads and supporting systems.

[Panel member, 2:45 PM, Skyline Room] [Mentor, 1:30 PM, North View Lounge]

Dr. Rachell Ornan



Dr. Ornan is a design researcher and experience designer for unique interior environments. She has a diverse background which includes design development of aircraft flight deck displays, systems for the International Space Station, space hotel and CST-100 Starliner concept interiors. She directs the cabin research portfolio Boeing Commercial Airplanes and engages sales, marketing, engineering and airlines in collaborative research related to the future of interiors and passenger experience. Her work ensures a commercially viable, preferred product while balancing value to airline and Boeing. In her spare time, she can be found outdoors, in a pool, traveling, making new friends, throwing a party, or walking the dog.

[Panel member, 2:45 PM, Skyline Room] [Mentor, 1:30 PM, North View Lounge]

**Dr. Jan
Vandenbrande**

See page 15

[Panel member, 2:45 PM, Skyline Room] [Mentor, 1:30 PM, North View Lounge]

Learn – Grow – Take Flight Ed Wells Partnership



SPEEA represented employees looking for innovative and effective ways to develop their careers and leverage their talents should check out the Ed Wells Partnership (EWP). This joint initiative between SPEEA and the Boeing Company provides training and career development resources for SPEEA represented employees to enhance their technical and professional skills. Let us help you...

<http://edwells.web.boeing.com>



Presenters

**Dr. Frederick
"Tad" Calkins**



He is an Associate Technical Fellow at Boeing focused on smart materials, adaptive structures, and active flow control technologies for military and commercial aircraft. He is developing Shape Memory Alloy (SMA) actuators and supporting technology that provide new capability to aircraft, including flight tests, full scale demonstrations, and application development. Currently he is the Principle Investigator for Boeing's SMA based Remote Control Actuated wind tunnel model technology. He received his PhD in Aerospace Engineering and Engineering Mechanics from Iowa State University 1997 and his BA in Astrophysics from Princeton 1988. He is a certified TRIZ (Theory of Inventive Problem Solving) practitioner. He is a retired Army Colonel, having served as the Washington National Guard commander of the 205th Regiment (Training) and as the State Director of Logistics responsible for emergency response operations.

[Speaker, 9:45 AM, South View Lounge]

**Dr. Santosh
Devasia**



Santosh Devasia received the B.Tech. (Hons) from the Indian Institute of Technology, Kharagpur, India, in 1988, and the M.S. and Ph.D. degrees in Mechanical Engineering (ME) from the University of California at Santa Barbara in 1990 and 1993 respectively. He is the Director of the Boeing Advanced Research Center (BARC) at the University of Washington (UW) depts.washington.edu/barc/ and a Professor of Mechanical Engineering at the UW, Seattle where he joined in 2000 after teaching from 1994 to 2000 in the ME Department at the University of Utah, Salt Lake City. He is a fellow of ASME. His current research interests include control of multi-agent systems, including precision human-machine systems. Additional details of current efforts can be found at:

faculty.washington.edu/devasia/

[Speaker, 9:15 AM, Skyline Room]

Jim Glidewell



Jim Glidewell has been supporting High Performance Computing systems at Boeing since the early eighties. As a member of the support team for Boeing's Cray systems, he worked on five generations of Cray systems, starting with the Cray-1. Jim has served as his group's primary focal for job scheduling and resource accounting for over twenty years. For the past several years, he has served as technical lead of the Enterprise HPC group. He also serves as the technical focal for PBS Professional within Boeing, as well as being responsible for support of PBS Pro on Boeing's Enterprise HPC Service.

[Speaker, 3:15 PM, South View Lounge]

Teresa J. Konopka



Teresa loves flying and even has some student flight hours in the Cessna 162 and Robinson 22 to prove it! She works in Airplane Safety Engineering to ensure that passengers will get home safely and not suffer fatal injuries from an airplane. Teresa has a patent pending on drone payload technology thru Boeing Intellectual Property. She is excited about the integration of unmanned aerial vehicles into the national airspace. On her free time, she enjoys playing Frisbee and volunteering with dogs / cats at the local animal shelter. To connect with Teresa on LinkedIn, go to www.linkedin.com/in/tjkonopka

[Speaker, 1:30 PM, Skyline Room]

Presenters

Neno Novakovic



Mr. Novakovic has more than 20 years of experiences in various aircraft systems design, integration, testing, and certification. He received a BEE and MS degree in Electrical Engineering from the University of Sarajevo, Bosnia and Herzegovina. In his early career, working for Department of Defense in former Yugoslavia, he was a part of R&D team, developing turbo-jet engine control and health monitoring system. In 2009, he joined UTC Aerospace Systems, Aircraft Electric Systems division and since he has been developing electric power systems for major commercial programs.

In the recent years, his focus is on Aircraft Electrical Power System and Secondary Power Distribution Optimization where he contributed with several U.S. patents and technical publications. His technical articles are published in SAE Aerospace journals, and presented at international conferences and seminars.

[Speaker, 2:45 PM, South View Lounge]

Leslie Pomeroy



Leslie Pomeroy has four years of experience as a Flight Controller for the International Space Station (ISS) at NASA's Johnson Space Center in Houston, TX. In her role, she supported ISS on-board communications and computer systems from Mission Control. As a CRONUS Flight Controller, she led projects for a new radio on-board the ISS to be used with visiting vehicles (such as the Boeing CST-100 and the SpaceX Dragon) and an emergency-communication response system for astronauts. After finishing her work at NASA, Leslie now works as an efficiency consultant for local non-profit organizations. She graduated with her B.S. in Mechanical Engineering in 2010 from Michigan Technological University.

[Speaker, 9:15 AM, South View Lounge]

Jimmy Ragan



With a lifelong passion for all things space related, Jimmy is pursuing a variety of interests at the University of Washington majoring in Aerospace Engineering, Astronomy and Physics. Jimmy is a fourth year member of the Society for Advanced Rocket Propulsion, and this year's propulsion technical lead. He is currently leading efforts to optimize their existing hybrid motor and starting development of a new liquid propellant rocket. He has also served as the president of the Astronomy Undergraduate Engineering Group, working to create telescope instrumentation for the University of Washington's observatory. He has spent the last two summers working at NASA's Marshall Space Flight Center developing microgravity experiments for the International Space Station.

[Speaker, 2:00 PM, Skyline Room]

Bob Robins



Since 1990 Bob has worked on numerical modeling and data analysis for studying the evolution of trailing vortices, first with NorthWest Research Associates and since 2014 as a consultant to the Volpe National Transportation Systems Center. Among the modeling tools developed by Bob used to study trailing vortices is a 3-D parallel LES incompressible Navier-Stokes solver. Bob has B.S. and M.S. degrees in Applied Math from New York University.

[Speaker, 1:30 PM, South View Lounge]

Presenters

Risto Rushford



As of the 2018-19 academic year, Risto is a senior in Portland State University's Global Supply Chain Management undergraduate program. With a long-term goal of working in the commercial space sector, he'll receive his B.S. degree in June 2019, and plans to proceed into a Masters of Systems Engineering.

Risto is involved with the Portland State Aerospace Society as a project manager, co-founder and current chair of the PSU AIAA student branch, and team captain for PSU's entry into the Base 11 Space Challenge. His goal with PSAS is familiarizing himself with the business and engineering operations of the aerospace sector and the commercial space industry in particular. Visit [linkedin.com/in/risto-rushford-060486](https://www.linkedin.com/in/risto-rushford-060486) for more information.

[Speaker, 2:00 PM, South View Lounge]

Joseph Shields



Joe Shields is the lead mechanical engineer at the Portland State Aerospace Society, specializing in composite manufacturing and component design. He led the development of their sounding rocket's structure and is currently working on the structures for their cubesat, OreSat. He also mentors student members within PSAS and provides engineering support for Pacific Diabetes Technologies. He earned bachelor's degrees in mechanical engineering and physics from Portland State University in 2016, focusing on fluids and electromagnetism.

Joe is passionate about open hardware and aims to make aerospace technologies more accessible by sharing his experiences. To read more about his work or contact him, please visit joedang.github.io.

[Speaker, 2:00 PM, South View Lounge]

Lane Slagle



Lane Slagle, Founder/Director of Starfish Education, specializes in STEM (Science, Technology, Engineering, Math) education, curriculum design, and professional development for K-12 schools, organizations and outreach providers. A former teacher, district administrator and county administrator, Lane began her career teaching both elementary and middle school before opening her own consulting business centering on STEM. Along with writing STEM curriculum, speaking at conferences, and facilitating workshops, Lane is a Google Education Trainer, a Microsoft Teacher Trainer and a Raspberry Pi Certified Educator. Recognizing the importance in sparking STEM interest in youth, Lane sits on the board of the National Girls Collaborative Project and serves on the education board at The Museum of Flight.

[Speaker, 10:30 AM, Skyline Room]

Presenters

Dr. Philippe Spalart



Philippe Spalart studied Mathematics and Engineering in Paris, and obtained an Aerospace PhD at Stanford/NASA-Ames in 1982. Still at Ames, he conducted extensive Direct Numerical Simulations of transitional and turbulent boundary layers. Moving to Boeing in 1990, he created the Spalart-Allmaras one-equation Reynolds-Averaged Navier-Stokes turbulence model. He wrote a review (once described as “discerning and sobering”) and co-holds a patent on airplane trailing vortices. In 1997 he proposed the Detached-Eddy Simulation approach, blending RANS and Large-Eddy Simulation to address separated flows at high Reynolds numbers with a manageable cost. He was elected to the National Academy of Engineering in 2017. Recent work includes refinements to the SA model, computational aeroacoustics, and theories for aerodynamics and turbulence.

[Speaker, 9:45 AM, Skyline Room]

Jingyang Wu



Jingyang Wu is an undergraduate student at University of Washington with a major in aerospace engineering and a minor in philosophy. She is currently a student researcher at UW Plasma Dynamics Lab as well as UW Nonlinear Dynamics and Control Lab, and her main research focuses are in space systems and control. Wu’s research experiences include satellite orbit design and modeling, thermal vacuum chamber design and manufacturing, and CFD modeling. She is also interested in cross field studies and has helped a local artist to build CFD simulations for his movable sculpture designs.

[Speaker, 10:30 AM, South View Lounge]

Rising Leaders Keynote

Adam Wuerl



Adam Wuerl is the Director of Advanced Concepts and Strategy at Blue Origin, which explores new concepts for launch systems, payloads, and in-space vehicles to further the vision where millions of people are living and working in space. Adam began his career in Seattle at Andrews Space, spent nine years at Lockheed Martin in Sunnyvale, CA and Huntsville, AL, and then moved back to Washington and spent five years at Spaceflight Industries before joining Blue.

He has worked on launch vehicles (mostly conceptual), satellites (all real), missile defense systems (some of both), and other things he can’t talk about. Adam has a B.S. in Aerospace Engineering from the University of Washington and an M.S. in the same from Stanford.

[Rising Leaders Keynote speaker, 9:15 AM, North View Lounge]

Startup Company Profiles

Echodyne

Echodyne offers the world's first compact solid-state true beam-steering radar for a wide range of industries and applications. Our high-performance software-defined radars work in all weather and are designed for autonomous vehicles, unmanned aircraft & drones, and security of borders, critical infrastructure, and smart cities. The company combines the patented technology of metamaterials with powerful software to create a radar sensor with unprecedented performance at commercial price points. Echodyne offers its radars to companies working in Automotive, Transportation, Critical Infrastructure Protection, Border Security, Smart Cities, Airspace Management (incl UTM), and Unmanned Aircraft Systems (UAS). Privately held, the company is based in Bellevue, Washington, and is backed by Bill Gates, NEA, Madrona Venture Group, Vulcan Capital, and Lux Capital among others.

<http://echodyne.com>

[Panel Member, 11:00 AM, Skyline Room]

Space Entrepreneurs

The Space Entrepreneurs is dedicated to catalyzing the growth of commercial space, starting in Seattle. We organize regular events designed to help people connect with other NewSpace professionals, to learn more about the industry, and to have a great time with other like-minded people. Founded in 2014, Space Entrepreneurs has over 800 members and meets regularly around the Seattle area. Join us at www.meetup.com/spaceentrepreneurs

<http://thespaceentrepreneurs.com>

[Panel Member, 11:00 AM, Skyline Room]

Synchronous

Synchronous is a group of experienced engineers across a mix of disciplines who can't help but look at the whole-picture from problem to prototype. We enjoy a challenge and bring determined cognizance to helping our clients achieve their goals. Our staff has extensive experience in planetary and deep space missions as well as commercial and earth observation. Our independence and agility enable us to support a wide variety of work, from system architecture and longer term design to jumping in to support quick studies and mission critical tiger teams as well as performing prototype development and testing.

<http://synchronous.us>

[Panel Member, 11:00 AM, Skyline Room]

Startup Company Panelists

Leo McCloskey
Echodyne



Leo McCloskey leads Echodyne's marketing efforts across its multiple customer segments. Prior to joining Echodyne, he led marketing efforts to companies in automotive, enterprise software, global networking, and end user experience management. Leo contributes significant expertise in connected services, software, technology and advanced networking. He has held senior leadership positions at IntelliTax, Nexagent, Ebone, Terabeam, and EDS, Inc. where he defined a novel method for connecting customers to a distributed global service delivery infrastructure. He holds a B.A. in Russian studies and language from Dickinson College.

[Panel Member, 11:00 AM, Skyline Room]

Sean McClinton
The Space
Entrepreneurs



Entrepreneurs and operations professional. Founded one of the first online Christmas tree retailing companies in the country. Helped scale up a global health products company in the United States after interning in Guangdong, China out of college. Supported sales teams on their largest accounts for a local Fortune 100 company. Founder of the Space Entrepreneurs Meetup in Seattle, a group of over 800 space industry professionals catalyzing the growth of commercial space, starting in Seattle. Currently Operations Manager at RBC Signals, a Seattle-area space startup making life better for people on Earth using data from space. Founded and run SpaceToTravel, helping people have out of this world travel experiences. Lifelong athlete - former college football player (University of San Diego) and current aspiring weekend tennis warrior. Living in Greater Seattle with wife and three kids.

[Panel Member, 11:00 AM, Skyline Room]

Maggie Scholtz



Ms. Scholtz has significant experience in the design and development of space systems through her previous experience on the Mars Science Laboratory (MSL) and Mars 2020 projects at JPL and her spacecraft development activities as a member of technical staff at Planetary Resources. Ms. Scholtz's work has helped to pave the way for resource extraction tools on government and commercial missions, including the first drill to operate on Mars. As President of Aerospace & Space at Synchronous, Maggie works with the NewSpace community on the full lifecycle of their missions, helping to find the right blend of flight-proven and cutting-edge technology.

[Panel Member, 11:00 AM, Skyline Room]

Don Weidner
Moderator



Don is a professional investor in exponential technologies — autonomous vehicles, robotics, solar power, cryptocurrency, and space. He has founded 6 companies. He has been interviewed by KIRO radio, International Business Times, the Seattle Times, and IEEE Spectrum. He has appeared in Luxe magazine and Seattle Magazine. He has an MBA from Thunderbird and recent study at Singularity University, International Space University and MIT. He has also built a world-class sci-fi collection.

[Moderator, 11:00 AM, Skyline Room]

Mentors

Gabriella Blackner See page 12
[Mentor, 1:30 PM, North View Lounge] [Panel member, 2:45, Skyline Room]

Lana Neyolova See page 15
[Mentor, 1:30 PM, North View Lounge] [Panel member, 2:45, Skyline Room]

Jason Slagle



Jason Slagle is Director of Propulsion for the Boeing 787 Dreamliner with overall responsibility for the integrity of engines, nacelles, engine build-up systems, pylon/fairing structures and systems and propulsion system functionality. He is also responsible for management and direction of the overall Propulsion Life Cycle Product Team. Previously, he was Director & Chief Engineer of Engines and Fuels in Boeing Commercial Airplanes. Prior to Boeing, Jason held multiple leadership roles at General Electric Aviation, Lockheed Martin Aerostructures and Cessna. He has a BS in Aerospace Engineering from The Pennsylvania State University, graduate studies in Mechanical Engineering at Johns Hopkins, and a Master's in Management and Engineering from MIT. Additionally, Jason completed the Advanced Management Program at Harvard.

[Mentor, 1:30 PM, North View Lounge]

Jan Vandenbrande See page 15
[Mentor, 1:30 PM, North View Lounge] [Keynote, 8:15 AM, Skyline Room]
[Panel member, 2:45 PM, Skyline Room]

Dr. Bob Winn See page 15
[Mentor, 1:00 PM, Room 1A] [Keynote speaker, 12:30 PM, Skyline Room]

Resume Workshop

Erinann Corrigan



Ten plus years with TenCate Toray as Account Manager and Boeing Commercial Key Account Manager. Prior experience with Solvay Cytec Fiberite as Interior Materials Account Manager, Market Development Specialist for ICI Composite Structures, Thermoplastic Composite Manufacturing Processes, Technical Service Engineer for thermoplastic composite materials, APC-2 products. Started career as a materials engineer working for Northrup Aircraft. BSE Materials Engineering from VaTech.

[Resume Workshop Leader, 2:45 PM, North View Lounge]

Lisa Schleuter



Lisa Schleuter is a Structural Design Engineer at Boeing. Having worked on 787, 777X, Product Development, and New Airplane programs, she has worked on a variety of wing trailing edge structures, including Flap Supports, Trailing Edge Ribs, Flight Test modifications, and Spoilers. Lisa has a Civil Engineering Degree, as well as an Aerospace minor, from Montana State University.

[Resume Workshop Leader, 2:45 PM, North View Lounge]



Notes

What is AIAA?

The American Institute of Aeronautics and Astronautics (AIAA) is nearly 30,000 engineers and scientists, and 95 corporate members, from 85 countries who are dedicated to advancing the global aerospace profession. The world's largest aerospace technical society, the Institute convenes five yearly forums; publishes books, technical journals, and Aerospace America; hosts a collection of 160,000 technical papers; develops and maintains standards; honors and celebrates achievement; and advocates on policy issues. AIAA serves aerospace professionals around the world—who are shaping the future of aerospace—by providing the tools, insights, and collaborative exchanges to advance the state of the art in engineering and science for aviation, space, and defense.

Special Thanks to Our Sponsors:

Platinum Sponsor



Silver Sponsor



Registration Sponsors



AIAA PNW Volunteers

Events of this type are the result of the efforts of a large team of volunteers who have given generously of their time and talent to bring this to our local AIAA membership and broader aerospace community. Special thanks to this year's symposium organizing committee:

Agnes Blom-Schieber, Co-Chair

Brent Pomeroy, Co-Chair

Melanie Kwong

Lane Slagle

Ryan Tedjasukmana

Kevin Chau

Megan Harrington

Jose Martinez

Priscilla Martinez

Paul Vijgen

Chris Roberdeau

Emmanuel Domingo



**American Institute of Aeronautics and Astronautics
Pacific Northwest Section**