



Eric Anthony Foss, C.C.

Research Engineer, Schweitzer Engineering Laboratories

WSU Alumnus in Boise, Idaho

December 20th, 2023

Dear Washington State University Honorary Degree Committee,

I am writing to nominate [REDACTED], for an honorary doctoral degree from Washington State University, his alma mater. [REDACTED] is a highly accomplished aerospace engineer and technical fellow who has made significant contributions to his industry over his thirty-five years career at Boeing as an experimental modal and ground vibrations test engineer. Moreover, despite his retirement in 2016, he has not slowed down. [REDACTED] has dedicated the last 15+ years to the betterment of student regional, state, and international science fairs, initially helping with his children's projects, then moving on to mentoring other students, transitioning to a pinnacle role in the Washington State Science and Engineering Fair, catalyzing the growth of additional science fairs in the region, and eventually judging at the International Science and Engineering Fair, year after year. [REDACTED] has taken his lifelong love of learning and graciously extended it to the benefit of tens of thousands of students, and to the betterment of STEM fairs for years to come.

I believe that [REDACTED] embodies the values of Washington State University and has contributed greatly to the university's own dedication to STEM education in quality, quantity, and effectiveness. He is an excellent candidate for an honorary degree from WSU.

Listed below are the names of colleagues and professionals who have first hand experience with [REDACTED] aforementioned contributions and are willing to attest to the benefit that he has brought to science fairs and education over the last 15+ years.

Lois Lugg

Director, Washington State Science and Engineering Fair

ljlugg@bpa.gov

Dennis Heinder

Board Member of Washington State Science Fairs

dennis@rextorgroup.com

Michael Huey, DMD

President, Washington State Science and Engineering Fair

mhuey@msn.com

Thank you for your time and for considering my nomination.

Sincerely,

Eric Anthony Foss

██████████
STEM Education Leader and Advocate, 15 years

Retired Aerospace Engineer, 35 years

Proud WSU alumnus, Class of 1974

Phone number: ██████████

E-mail: ██████████

Executive Summary

██████████ journey to a rewarding engineering career began in high school (1965-1968) with memorable science fair projects involving computers and high voltage electricity. The projects won awards at the Spokane science fair. From the efforts and encouragement, it was clear that his life's calling was to be an engineer, a goal he pursued at WSU from 1968-1974. A 42-year career followed, first as a federal employee and then as a Boeing test engineer, retiring in 2016 as a Boeing Engineering Fellow.

As ██████████ progressed in his career, the passion for engineering sparked during his high school years continued to influence him. Nearing the end of his 42-year professional journey, he found himself mentoring a student headed for the Washington State Science & Engineering Fair. This opportunity rekindled his own high school fascination with electronics and physics. He is thrilled to see today's students experience the attraction to science he felt 58 years ago.

Upon learning that Washington was performing poorly at science education, these personal experiences drove ██████████ to become an advocate for Project Based Learning (PBL), where students work on a project over an extended period that engages them in solving a real-world problem. From this engagement, students develop deep content knowledge, critical thinking, creativity, and communication skills. Research has found that PBL unleashes a contagious, creative energy among students that draws them towards STEM. To strengthen this pipeline, ██████████ has become involved in regional, state and national science fairs and competitions, joining a science education network that encourages students to explore and develop a passion for science, similar to his own journey.

Over the past 15 years, including 8 years post-retirement, ██████████ has taken on various leadership roles in several organizations. He currently serves on three non-profit boards, including President of a regional science fair and Vice President of the state science fair. ██████████ efforts include lobbying legislators, fundraising, outreach, and presenting at conferences and symposiums, as well as organizing teacher training events. His fair responsibilities include planning, logistics, awards, judging, mentoring students, and accompanying them to national and international competitions. Since high school

student research must be novel, his judging and mentoring require him to stay current with the frontiers of knowledge in various fields.

Every year he hears from students who thank him for his role in the experiences that changed their lives. With the good fortune in his own career, [REDACTED] has been delighted to “pay it forward” by championing the next generation of scientists and engineers who will lead us into the future.

STEM Education Leader and Advocate 2009-present

2019-present | Co-founder and Board President, Central Sound Regional STEM Education Foundation (CSRSEF) (www.csrsef.org)

Bellevue College initiated CSRSEF as a science fair in 2010 as part of their Science and Math Institute. In 2019 they discontinued it after finding that most participating students went on to UW or WSU, not benefiting BC. [REDACTED] and two other volunteers reorganized it that year as an independent non-profit foundation to support and fund the [Central Sound Regional Science & Engineering Fair](#)ⁱⁱ. CSRSEF the Fair is an annual gathering and showcase for Puget Sound high school students who have completed works of original science research or engineering design. It grew from 25 students in 2010 to 280 students in 2024. All participants learn the scientific or engineering method as required by the Next Generation Science Standards (NGSS), and many discover a love of science that leads to future study and a career in STEM.

The CSRSEF Foundation uniquely promotes STEM education in Washington State through project-based learning, or [PBL](#)ⁱⁱⁱ. PBL is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging, and complex question, problem, or challenge. Science fairs are the ideal showcase for presenting their work.

[REDACTED] leads the organization and is a member of the CSRSEF final judging panel that selects five grand champions to advance to the Regeneron International Science & Engineering Fair ([ISEF](#)^{iv}). The quality of the student work has become an upward spiral of excellence, and many of the finalists are doing college graduate level work in high school (see addendum). At the international fair, CSRSEF finalists regularly win awards, scholarships, and fellowships^v. In terms of finalist award performance at the international fair, CSRSEF was the top high school science fair in the world in 2022 and tied for first in 2023.

Responsibilities at CSRSEF include:

- Student project first and second round judging; special award judging
- Registration, awards, outreach, fundraising, judge recruitment, fair planning

- Foundation Board President

2011-present | Vice President, Board member, Washington State Science & Engineering Fair (WSSEF^{vi})

WSSEF, the statewide showcase for student science research, is held annually at Bremerton High School, and typically hosts around 450 students from across the state. Some students win awards, prizes, scholarships, and promotion to ISEF. WSU offers scholarships to WSSEF students from both the College of Arts and Sciences and the Voiland College of Engineering and Architecture.

Responsibilities at WSSEF include:

- Fair planning and management
- Student project judging
- Student mentoring
- Fair outreach chairman
- Board service

2011-present | Education Committee, Washington State Academy of Sciences (WSAS^{vii})

WSAS was co-organized by WSU President Lane Rawlins and UW President Mark Emmert in 2006 to serve as an objective source of science policy support to the State Legislature and Executive Branch. The WSAS Education Committee was created to advise on education matters and to nominate Washington State's most promising high school students as delegates to the annual American Junior Academy of Science Conference (AJAS). Current members of the Education Committee include Dr. Doug Call, WSU Senior Vice Provost and Regents Professor, Dr. John Roll, WSU Vice President for Research, Dr. Noel Schultz, Schweitzer Chair in Electrical Engineering at WSU, Dr. Terry McElwain, WSU Regents Professor, and Dr. Kristi Morgansen, Chair, Department of Aeronautics & Astronautics at UW. Former WSU Provost, Dr. Robert Bates, was the first chair of the committee from 2010-2015.

In 2010, [REDACTED] urged WSAS inaugural President Dr. Gordon Orians to add education to the WSAS mission and establish a process for sending top Washington science students to AJAS. Dr. Orians agreed and set up the Education Committee in 2010. [REDACTED] was a contributor to the report from the 2011 WSAS annual meeting, "STEM Education in Washington State: The Facts of the Matter."

Responsibilities at WSAS include:

- Education committee member ex officio, longest serving member, student science competition liaison, “external expert”.
- From his unique position in the science fair community, [REDACTED] leads and facilitates fair directors on the nomination of Washington State’s 10-12 most promising high school science researchers.
- After review of the nominations, the Education Committee selects some or all of these students as delegates to the annual AJAS Conference, to “introduce, encourage, and accelerate them into the world of science, technology, engineering, and math.”
- At the conference, [REDACTED] chaperones, mentors, and coaches students as they attend tours, keynotes, plenaries, and display their posters at the AAAS meeting. All students receive an AJAS Lifetime Fellowship

2021-present | Board, National Association of Academies of Science (NAAS^{viii})

NAAS was created by the American Association for the Advancement of Science (AAAS) to organize and fund the American Junior Academy of Science ([AJAS^{ix}](#)) Conferences. AJAS is held in conjunction with the AAAS Annual Meeting. The AJAS mission is to introduce and welcome students nominated by each state academy into the professional world of science and engineering. [REDACTED] was elected to the Board in 2022.

Responsibilities at NAAS include

- Member of AJAS organizing committee; logistics, speakers, Breakfast with Scientists event, poster sessions, and tours of nearby scientific institutions.
- Led the site visit for AJAS-AAAS Seattle 2020
- Currently preparing for 2025 AJAS-AAAS in Boston, with sponsorship from MIT and Harvard.

2009-present | Category and special awards judge, Regeneron (formerly INTEL) International Science & Engineering Fair (ISEF)

Each May, more than 1700 students from approximately 75 countries and territories compete at the ISEF fair for scholarships, tuition grants, internships, scientific field trips and grand prizes. Each of the ~350 ISEF affiliated fairs worldwide are permitted to send a number of students to ISEF based on their fair size. There are 6 ISEF affiliated fairs in

Washington State that send around 25 students to ISEF each year. (The Eastern Washington fair is sponsored by Schweitzer Engineering Laboratories and until recently was held at the Spokane WSU campus. Schweitzer generously funds the ISEF travel expenses for the Eastern Washington students.)

Responsibilities at ISEF include

- Volunteer chaperone for Washington ISEF finalists (13 years)
- Mentor for WA finalists preparing for judging at ISEF
- 2 years as an ISEF engineering category project judge
- 8 Years as the lead judge and organizer for special ISEF awards offered by Society for Experimental Mechanics and American Institute of Aeronautics & Astronautics

2012-2023 | Organizer and supporter, Washington Junior Science & Humanities Symposium (JSHS^x)

Forty-year-old student competition sponsored by US Army, Navy, and Air Force. Held at Seattle Pacific University for many years, then held in Bremerton, students compete by submitting a research paper and the best are selected for oral presentation. Of those, the 5 best are chosen to be sent to the national JSHS event.

Responsibilities at JSHS included:

- First round research paper reviewer and judge
- Second round oral presentation judge
- Chaperone and advisor for Washington students to National competition

2010-2019 | Advisory Board, original Central Sound Regional Science & Engineering Fair at Bellevue College

Originally organized at Bellevue College, CSRSEF is open to high school students in King and Snohomish County.

Responsibilities at CSRSEF included:

- Student project judging

- Student mentoring, preparing for national and international competitions
- Fair organization and planning
- Advisory Board service

2012-2013 | Organizer, Steering Committee, [Seattle Science Festival](#)^{xi}.

The Seattle Science Festival was a collaboration of over 80 Seattle area companies, non-profit organizations, scientific & educational institutions to celebrate science, technology, engineering, and math (STEM) and show how integral they were to the region's culture and prosperity. The event included 150 exhibits, displays, demonstrations, guest speakers such as Stephen Hawking, and 30,000 participants.

Responsibilities included:

- Initiating conversations with Pacific Science Center management that led to the event.
- Served on the steering committee for both years
- Organized the science fair student project exhibition.
- Organized the Boeing exhibits employing 90 Boeing volunteers, one third from the Boeing Technical Fellowship

2011 | Co-founder and advisor, FIRST Robotics Team 3684, Cleveland High School, Seattle

2009 | Co-founder and mentor, FIRST Robotics Team 2907, Auburn Mountainview High School, Auburn, WA

Project based FIRST programs introduce students to engineering and coding and engage them in creative learning environments in schools and communities. Students work collaboratively to solve an annual themed robotics challenge. They compete in local, regional, state, and national competitions. Team 2907 was at a school near ██████ residence. Team 3684 was at an inner-city school near Foss's workplace where 91% are students of color. ██████ obtained Boeing sponsorship grants for both teams.

Boeing Career 1981-2016

Until his retirement in 2016, [REDACTED] was a test engineer and Boeing Technical Fellow with the Boeing Test & Evaluation, Structural Dynamics Lab in Seattle. He performed structural dynamics validation testing of Boeing commercial, military and space products for 35 years.

[REDACTED] specialized in a structural validation test which identifies discrepancies between analytical models of structures and their physical prototypes. Validation of analysis by testing is an essential step in aerospace product development, large-scale system integration, and first flight safety assessments.

The testing process identifies the dynamic characteristics of a structure by measuring motion data from large sensor arrays to enable curve fit estimates of solutions to the matrix differential equations of motion. The curve fitting activity itself is performed on a greatly overdetermined set of equations containing nonlinearity, significant noise, and an unknown model order. This is a complex activity requiring a synthesis of mechanical, electrical, mathematical, computing and process skills. Only a few across the enterprise possessed this level of skill; [REDACTED] was the most experienced, having exercised it for forty programs inside and outside Boeing over his career.

Over his career, [REDACTED] supported Boeing programs such as Sea Launch, F-22, Upper Inertial Stage (IUS), Boeing Helicopters, Air Launched Cruise Missile, International Space Station, Mars-98, Short Range Attack Missile (SRAM), Shuttle Back-to-Flight Program, Airborne Laser, Free Electron Laser, Joint Strike Fighter, 737, 747, KC-46 Tanker, 787, Large Cargo Freighter, AWACS, P-8, and certain classified programs.

Boeing Technical Fellowship

- **Elected Boeing Associate Technical Fellow (ATF) 2008**
- **Elected Boeing Technical Fellow (TF) 2014**

The [Boeing Technical Fellowship](#)^{xii} is a “highly selective technical leadership career path.....As a result of the vetting process, the program includes only approximately 1.5% of Boeing’s workforce and represents some of the best engineering and scientific minds at Boeing and in the industry.”

Role at Boeing as a Technical Fellow:

- Enterprise expert with industry reputation for structural dynamics testing

- Enterprise expert in the measurement of structural energy dissipation (damping) and evaluation of treatments for vibration and noise suppression
- Supported 40 Boeing programs with testing and consulting services

Professional Societies

Member of the Society for Experimental Mechanics (SEM) since 1990.

- 2006, appointed Chairman of the SEM Sensors and Instrumentation (S&I) Technical Division. Organized S&I sessions at annual conference.
- Elected to the SEM Executive Board in 2009.
- In 2018 the SEM awarded him the prestigious Brewer Award as an “outstanding practicing experimentalist”.
- ■■■ is a chapter co-author of “SEM Handbook of Experimental Structural Dynamics”^{xiii} published by Springer.

Member of American Institute for Aeronautics & Astronautics (AIAA) since 2012

- Created and judged the AIAA “Look Up!” awards at International Science Fair

Early Career: US Bureau of Reclamation 1974-1981

- Mechanical Engineer, Grand Coulee Project, Coulee Dam, WA
- Specialized in vibration analysis of rotating machinery.

Education

- BS Mechanical Engineering, WSU, 1974

Publications

SEM Handbook of Experimental Structural Dynamics^{xiv}: Chapter co-author and editor. (published by Springer, 2022)

**Papers presented to the International Modal Analysis Conference (IMAC^{xv}):
(sponsored by the Society for Experimental Mechanics):**

Enhancement of Modal Swept Sine Data by Control of Exciting Forces, 8th IMAC, 1990

An Efficient Parallel Processor for Step Sine Modal Data Acquisition, 10th IMAC, 1992

A Low Stiffness Suspension System for Free-Free Modal Testing, 11th IMAC, 1993

*Investigation and Validation of a Flexure Interface for the Testing of Orbiter Payloads,
12th IMAC, 1994*

*Using Modal Test Results to Develop Strain to Displacement Transformations, 13th IMAC,
1995*

Free-Free Modal Testing Without Suspension Modes, 14th IMAC, 1996

Dynamic Calibration of a Dynamometer, 14th IMAC 1996

The CH-47 "Chinook" Helicopter Shake Test, 15th IMAC 1997

Modal Parameter Estimated of a Simulated Non-Linear Structure, 17th IMAC, 1999

Measurement System Noise, 20th IMAC, 2002

Dynamic Instability and Chatter During Milling of a Flexible Workpiece, 21st IMAC, 2003

Compliance Maps: A Graphical Tool for Making Structural Comparisons, 22nd IMAC, 2004

Photogrammetry of Aircraft Structures for Sensor Location, 23^d IMAC, 2005

Modal Damping Estimates from Static Load-Deflection Curves, 24th IMAC, 2006

Reducing Vibration of Skis and Snowboards, 24th IMAC, 2006

New Concepts GVT, 24th IMAC, 2006

Accelerometer Thermal Sensitivity, 25th IMAC, 2007

Viscoelastic Damper Performance Testing, 25th IMAC 2007

Articles published in Sound & Vibration magazine:

Ski Vibrations, Jan 1995

Helicopter Vibration and the Boeing CH-47 Chinook, Mar 1997

Ski and Snowboard Vibration, Jan 1999

SpaceShipOne Undergoes Ground Vibration Tests, Aug 2003

Compliance Maps, Jan 2004

Article published in Experimental Techniques magazine:

Enhancement of Modal Swept Sine Data by Control of Exciting Forces, Dec 1991

US Patents

6,945,122 **Measurement of Water in Crude Oil - Magnetic**

6,823,271 **Multi-phase Flow Meter for Crude Oil**

7,201,068 **Water Cut Meter for Measurement of Crude Oil in Water**

7,328,622 **Soft Support Systems and Methods for Dynamically Testing of Structures**

Awards

Washington State LASER Science Advocate Award Nomination - 2011

Nominated by Mary McClellan, Science Director, WA Office of Superintendent of Public Instruction (OSPI)

Boeing Career Awards, Citations

2014 Boeing “Meritorious Special Invention Award” for “A Novel Technique for Determining Equivalent Dynamic Properties of Complex Sandwich Structures”

2013 Invitation to join Boeing professional development training Technical Advisory Group (TAG).

2012 Invitation to author a chapter in new Springer Handbook; appointed Chair of Enterprise Structural Dynamics Test Community of Practice

2010 Invitation to present at Boeing Technical Excellence Conference (BTEC) 17; elected Executive Board, Society for Experimental Mechanics; Team Achievement Award, Defense & Space Div. (BDS) P8 Flutter Test

2009 Team Achievement Award, Boeing Commercial Airplanes (BCA) 747-8 Ground Vibration Test; Team Achievement Award, BDS P8 Ground Vibration Test; Team Achievement Award, BDS 767 Tanker Flutter Testing; Achievement Award, Damping Test Development for BCA.

- 2008** Invited to present at Boeing Technical Excellence Conference 14
- 2007** Invited to present and chair session at 1st Boeing Damping Conference; Outstanding Contribution Award, BCA 787 Program
- 2006** NASA Group Achievement Award, BDS Shuttle Back to Flight Program; BCA 787 Exceptional Performance Award for Damping Test Development
- 2002** Exemplary Performance Award BDS F-22 Program
- 2001** Letter of Appreciation, BDS AWACS Program; Appreciation Award, BDS Air Launched Cruise Missile Program
- 1999** Commendation Award, BDS Space Station Robot Arm Dynamic Characterization
- 1998** Excellent Performance Award and letter from BDS Sea Launch Program
- 1997** BDS F-22 Sustained Performance Award; F-22 Outstanding Performance Award; Helicopters Division commendation letter from Program Manager
- 1995** F-22 flutter testing commendation letter from Program Manager
- 1991** Short Range Attack Missile Program, commendation from Program

Addendum

Science fairs and competitions have evolved in sophistication over the last twenty years. Many ambitious students are doing advanced original research, sometimes in top labs; some even have their work published in peer reviewed journals. To understand and appreciate the quality of the students' work and the challenge of comparing and judging them, here are five examples of award-winning high school student work that were recently considered by the WSAS Education Committee for the AJAS Fellowship. The first three students are now at Stanford, the fourth is still in high school, and the fifth has started her first year at Princeton. ISEF finalist and AJAS Fellowship credentials are highly regarded by college admissions officers.

Annie Adhikary, Tesla STEM High School: "[Identification of Novel Diagnostic Neuroimaging Biomarkers for Autism Spectrum Disorder Through Convolutional Neural Network-Based Analysis of Functional, Structural, and Diffusion Tensor Imaging Data Towards Enhanced Autism Diagnosis](#)"

Vedant Srinivas, Eastlake High School: "[Biomimicry of the Boxfish: A Computational Analysis and Wind Tunnel Study of Aerodynamic Drag Reduction of Class 8 Heavy Vehicle Trailers](#)"

Christine Ye, "[Inferring the Neutron Star Maximum Mass and Lower Mass Gap in Neutron Star–Black Hole Systems With Spin](#)" (Top winner of Science Talent Search, 2022, \$250,000 prize)

Bliss Singhal, Issaquah High School: "[Uncovering the Epileptogenic Brain Networks With Independent Component Analysis and Deep Learning: A Novel and Comprehensive Framework for Scalable and Generalizable Seizure Prediction With Unimodal Neuroimaging Data in Pediatric Patients](#)"

Ourania Glezakou-Elbert, Hanford High School: "[Controlled Triangular Edge-Asymmetries as Means of Increasing Diode Efficiency in a Single Layer Superconductor](#)"

Links

ⁱ CSRSEF Foundation, Main Page, <https://www.csrsef.org>

ⁱⁱ Central Sound Fair, Main Page, <https://www.centralsoundfair.com>

ⁱⁱⁱ Buck Institute for Education, PBLWorks, <https://www.pblworks.org>

^{iv} Society For Science, International Science and Engineering Fair, <https://www.societyforscience.org/isef/>

^v Washington State Science and Engineering Fair, Washington State ISEF Finalists 2024, <https://www.isef2024.wssef.org>

^{vi} Washington State Science and Engineering Fair, Main Page, <https://www.wssef.org/>

^{vi} Washington State Academies of Science, 2024 AJAS Delegates, <https://washacad.org/washington-state-american-junior-academy-of-sciences-delegates/2024-ajas-delegates/>

^{viii} National Association of Academies of Science, Main Page, <https://www.academiesofscience.org/>

^{ix} Academies of Science, American Junior Academies of Science, <https://www.academiesofscience.org/ajas.php>

^x Junior Science and Humanities Symposium, Main Page, <https://jshs.org/>

^{xi} University of Washington News, *UW people, programs to shine at Seattle Science Festival*, <https://www.washington.edu/news/2012/05/29/uw-people-programs-to-shine-at-seattle-science-festival/>

^{xii} Wikipedia, Boeing Technical Fellowship, https://en.m.wikipedia.org/wiki/Boeing_Technical_Fellowship

^{xiii} Springer Nature, Handbook of Experimental Structural Dynamics – *Sensors and their Signal Conditioning for Dynamic Acceleration, Force, Pressure, and Sound Applications*, https://link.springer.com/referenceworkentry/10.1007/978-1-4614-4547-0_33#citeas

^{xiv} Springer Nature, Handbook of Experimental Structural Dynamics, <https://link.springer.com/referencework/10.1007/978-1-4614-4547-0>

^{xv} Society for Experimental Mechanics, IMAC, <https://sem.org/imac>