SYSTEMS ENGINEERING DEPARTMENT
NAVAL POSTGRADUATE SCHOOL

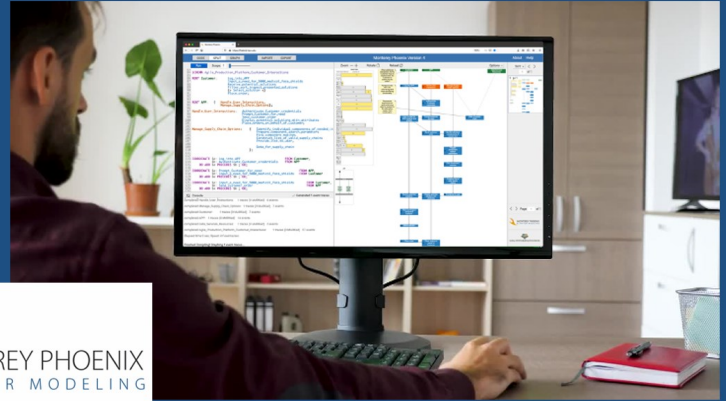## SYSTEMS ENGINEERING NEWSLETTER   March 2024

In This Issue:

- SE Spotlight
- Faculty News
- Student Stories
- Winter Quarter Awards and Graduations

Your system or process may be primed to behave in ways you never imagined or intended. Find and fix unexpected behaviors lurking in your design with Monterey Phoenix (MP), a user-friendly, NPS-developed language, approach and tool for modeling and reasoning about behavior.

MONTEREY PHOENIX
BEHAVIOR MODELING

https://nps.edu/mp

Letter from the Chairman

Welcome to the Systems Engineering Newsletter for the Winter quarter of the 2024 Academic Year!

This quarter, the SE Department graduated eleven Master of Science in Systems Engineering students. One of them, MAJ Bryan Pulicari, USA graduated with distinction, and was also recognized with the Meyer Award for Outstanding DL Student in Systems Engineering.

Don Muehlbach was recognized with the Meyer Award in Systems Engineering for DL teaching.

On March 29th, the Winter quarter's 206 graduates (including 19 international students from 12 countries), their families, faculty, staff, and guests attended the Winter Quarter Graduation Ceremony in King Hall. The commencement address was given by U.S. Air Force Lt. Gen. Michael T. Plehn, 17th President of the National Defense University.

Systems Engineering Chairman
Dr. Oleg Yakimenko

In the Winter quarter, SE faculty taught 23 resident and distance learning sections and kept advising four capstone project teams. They also continued guiding research of SE's Ph.D. students, serving on a variety of departmental and schoolwide committees; participating in scientific conferences, and working on FY24 reimbursable research projects.

I would like to thank all members of the SE department for their contributions and congratulate our winter graduates and their families once again. Please, spread the word about NPS and SE Department, and stay connected with your alma mater!

SE Faculty Received an Award at INCOSE IW 2024

Dr. Ronald Giachetti received a service award from the International Council on Systems Engineering (INCOSE), the professional society for systems engineering, for his service as the Chair of the Corporate Advisory Board (CAB). The CAB includes over 130 corporations and academic departments, and the CAB provides guidance to INCOSE leadership on the research, professional development, and systems engineering community needs. Dr. Giachetti served as co-chair for two years and then as chair of the CAB for two years from 2022-2024. In the role of CAB Chair, Dr. Giachetti was a voting member of INCOSE's leadership. He led the CAB by organizing monthly meetings, holding workshops to identify and generate priorities for INCOSE, and helped guide the strategic direction of INCOSE. The Systems Engineering department at NPS is a long-term CAB member and its faculty and students benefit from the ABET accreditation developed specifically for SE departments, the credentialing available after taking SE3100 Fundamentals of Systems Engineering, and access to many of the books, conferences, and other products of INCOSE.

Faculty News

Professors Participate in ONR's Frozen Flyer Experiment at Pituffik Space Base in Northern Greenland

Dr. Douglas L. Van Bossuyt (NPS Systems Engineering Department) and Dr. Britta Hale (NPS Computer Science Department) recently returned from an ONR-sponsored Unmanned Aerial Vehicle (UAV) experiment conducted in Northern Greenland at the Pituffik Space Base (formerly Thule Air Base). The Frozen Flyer experiment at Pituffik Space Base allowed commercial UAV vendors to test their systems in harsh arctic conditions with simulated maritime domain awareness, over-the-horizon logistics, and environmental characterization missions in support of potential future polar operations. The experimentation team tested in conditions including blizzards, nighttime and twilight operations, -30f temperature, significant winds, low visibility, and other challenging arctic conditions. It is anticipated that future testing will occur in polar conditions as UAV technology matures for the extreme environments found at the top and the bottom of the world. A full report is forthcoming on the significant findings of the event. Please contact Dr. Van Bossuyt for further information at douglas.vanbossuyt@nps.edu

Dr. Douglas L. Van Bossuyt (left) and Dr. Britta Hale stand in front of the Pituffik Space Base sign.

NPS Professors Participate in Energy and Cyber Security Tabletop Exercise in Moldova

Dr. Britta Hale (NPS Computer Science) and Dr. Douglas L. Van Bossuyt stand in front of a CORE-24 M sign in Chisinau, Moldova.

Recently Dr. Douglas L. Van Bossuyt and faculty from the NPS Computer Science Department and the Energy Academic Group participated in a Tabletop Exercise on Energy and Cyber Security in Chisinau, Moldova. The tabletop exercise focused on the hybrid threat landscape of energy resilience and cyber security. Experts from NATO and the Republic of Moldova participated in the Coherent Resilience 2024 Moldova (CORE-24 M) exercises over several days. More than 100 participants from 10 nations and 32 institutions participated in the tabletop exercise. More information is available at:
https://www.nato.int/cps/en/natohq/news_223672.htm

SE Professor Presents at the 2024 Reliability and Maintainability Symposium

Systems engineering Associate Professor Dr. Douglas L. Van Bossuyt recently presented a paper titled "ARCS-R: Mission Critical Combined Reliability and Cybersecurity Systems Engineering Analysis" at the 2023 Reliability and Maintainability Symposium in Albuquerque, New Mexico. The paper was jointly authored between Dr. Van Bossuyt, Dr. Britta Hale of the Computer Science Department at the Naval Postgraduate School, Dr. Nikolaos Papakonstantinou formerly of VTT Technical Research Centre of Finland, Dr. Ryan Arlitt formerly of the Technical University of Denmark, and Srinivasa Rao Palatheerdham formerly of the Southern Brittany University in France. The paper was well-received by conference participants and sparked several productive discussions.

The abstract of the paper is as follows: This paper explores how reliability analysis and cyber-security analysis can be combined using Artificial Intelligence and Machine Learning (AI/ML), and Large Language Models (LLM) to produce a continuously updated resilience analysis. This is achieved by modeling both the hardware and software of the system, and employing LLMs and AI/ML to continuously search for new software vulnerabilities and feed that information into continuously updating resilience models. A case study of a drone is presented that demonstrates the promise of the proposed method. It is expected that using the proposed method, named Assessment for Risk in Cybersecurity and Safety-Resilience (ARCS-R), will reduce failure rate of mission-critical cyber-physical systems by reducing the likelihood of a potential initiating event causing a prolonged degradation in system performance that impacts system resilience.

The paper will be available through IEEE Explore soon at this link: https://ieeexplore.ieee.org/xpl/conhome/1000626/all-proceedings Alternatively, please contact Dr. Van Bossuyt at douglas.vanbossuyt@nps.edu for a private copy of the paper.

SE Professors Attend the Conference on Systems Engineering Research in Tucson

At the end of March, Dr. Ron Giachetti and Dr. Douglas L. Van Bossuyt attended the annual Conference on Systems Engineering Research that was hosted this year by the University of Arizona Department of Systems and Industrial Engineering. SE Department PhD student John Phillips presented a poster at the conference. The conference had a full program of paper presentations, seminars, PhD student mentoring, panel sessions, and early career tenure track professor mentoring. Lively discussions about systems engineering, teaching systems engineering, and the future of systems engineering research occurred throughout the conference, and many connections with faculty and engineers at other institutions were renewed and strengthened.

Dr. Ron Giachetti, a wild west performer, and Dr. Douglas L. Van Bossuyt at the CSER banquet.

SE Professor Presents at Energy Short Course

Dr. Douglas L. Van Bossuyt recently lectured for two days out of a five-day Operational Energy short course put on by the NPS Energy Academic Group. The course contained 16 Marines and Sailors, and many visiting dignitaries. This was the second time the course has been presented to a live audience, and an asynchronous version of the course is under development. Dr. Van Bossuyt presented topics including Power Generation and Distribution, and Power Storage. Other topics presented by faculty from across NPS included Military Fuels, Climate Security and Energy, and Energy in Conflicts. The course concluded with an Energy Crucible exercise where participants applied their energy knowledge to real-world scenarios they may encounter in the near future.

Dr. Douglas L. Van Bossuyt surrounded by Sailors and Marines at the Operational Energy Short Course.

SE Professor Presented a Paper at CSER

Dr. Ronald Giachetti presented a manuscript that he co-authored with Dr. Hyatt Moore, "Sustainable Systems: Measuring Carbon Emissions of Navy Ships", at the Conference on Systems Engineering Research (CSER) 2024, which was held March 25-27 in Tucson, AZ

SE Faculty Received the "Jimmie" Hamilton Award

Dr. Andrew Machamer, Dr. Douglas L. Van Bossuyt, and CDR Mark M. Rhoades, USN (Ret.) were awarded the "Jimmie" Hamilton Award for their article, "Optimizing the Periodicity of Preventative Maintenance Inspection Based on Historical Reliability Data for Naval Steam Condensers." This annual award recognizes the best original technical paper published in Naval Engineers Journal during that award year.

Faculty Receives the Wayne E. Meyer Award
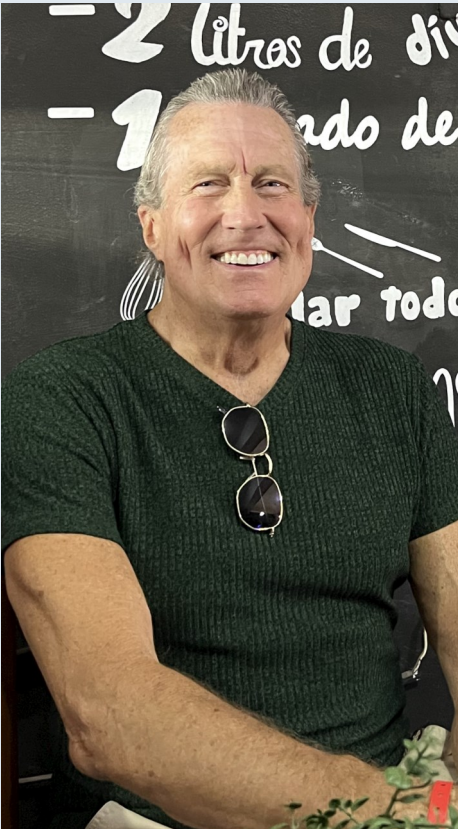
CAPT, USN (ret) Don Muehlbach, PhD was selected by the graduating students of cohort 312-223 to receive The Wayne E. Meyer Award for Teaching Excellence for March 2024 graduation. This was his 29th Meyer award. He joined the NPS SE department faculty as a Professor of Practice in February 2009.

Student Stories

Students Receives the Wayne E. Meyer Award

Major Bryan Pulicari is a native of Southern California and an accomplished professional with a passion for aerospace engineering and military aviation. Graduating with distinction from Embry-Riddle Aeronautical University, he earned a Bachelor of Science degree in Aerospace Engineering alongside a minor in Defense Studies. Building upon this foundation, Major Pulicari is currently pursuing a Master's Degree in Aviation Systems Engineering at the esteemed Naval Postgraduate School.

Throughout his military career, Major Pulicari has demonstrated leadership and aviation acumen. He has undergone extensive military education, including the Army Aviation Basic and Captain's Career Courses, the Command and General Staff College, Aviation Maintenance Officer's Course, Army Acquisitions Course, Cold Weather Leaders Course, and the US Army SERE Course. His aircraft qualifications include the CH-47 Block 1 and Block 2, UH-60A/L, UH-72A, C-12C/D, and other experimental and FAA-certified aircraft.

During his tenure with the 16th Combat Aviation Brigade in Fairbanks, AK, and the 82nd Airborne Division Combat Aviation Brigade at Fort Bragg, NC, Major Pulicari played pivotal roles in Army operations and an operational deployment. While in the 16th CAB MAJ Pulicari deployed as a heavy-lift helicopter platoon leader in support of Operation Enduring Freedom in Afghanistan during 2013-2014. Additionally, he notably served as a heavy-lift helicopter company commander of the Bravo Company 3-82 (Flippers), where he led a unit of 50 paratroopers and 12 CH-47F helicopters.

Following his graduation from the United States Navy Test Pilot School, Major Pulicari served as an Experimental Test Pilot at the U.S. Army's Aviation Flight Test Directorate in Huntsville, Alabama. In his capacity as XP and Division Chief, he leads a 25-person organization, overseeing the execution of programs and supporting various evaluated systems, developmental systems, as well as joint, commercial, and international programs. For his next assignment, Major Pulicari has been selected for a pivotal role as an Assistant Product Manager for PM Fixed-Wing, Multi-Domain Sensing Systems Organization.

Beyond his professional accomplishments, Major Pulicari finds fulfillment in his personal life. He has been happily married to his wife, Courtney Pulicari, for seven years, and together they reside in the suburbs of Huntsville, AL, along with their beloved puppy, Colton Pulicari.

Major Pulicari's awards and decorations include: the Meritorious Service Medal, the Air Medal, the Army Commendation Medal, the Army Achievement Medal, National Defense Service Medal, Afghanistan Campaign Medal, Global War on Terrorism Medal, NATO Medal, and Senior Army Aviator Badge.

MAJ Bryan Pulicari

ENS William Davis, from the SE Department at the Naval Postgraduate School, presented his thesis, "Decarbonization of Ships: Investigation into CO2 Emissions, Propulsion, and Mission Effectiveness", at the Interagency Advanced Power Group (IAPG) Electrical Systems Working Group (ESWG) Hybrid Meeting on March 14, 2024.

Awards and Graduations

Awards

Meyer Award for Outstanding student in Systems Engineering (Distance Learning)

312-223 MAJ Bryant Pulicari, USA

Meyer Award for Teaching Excellence in Systems Engineering (Distance Learning)

312-223 CAPT Don Muehlbach, PhD

Nominated for graduation with distinction (DL)

312 –223 MAJ Bryan Pulicari, USA

Graduations

Master of Science in Systems Engineering (DL)

Maj Tyler W. Davenport, USMC

Maj Alex C Horne, USMC

CW3 Caleb N. Grandy, USA

CW4 Joshua McCoy, USA

MAJ Bryan Pulicari, USA

LT Nicholas Corey, USN

LCDR Ryan R. Moeller, USN

LCDR Karl Petracek, USN

LT Jason P. Pinnow, USN

LT George Kruk Philbrick , USN

Systems Engineering Distance Learning Graduation Photos

LCDR Ryan "Bearplane" Moller, LCDR Kyle "Custer" Todd, and Dr. Douglas L. Van Bossuyt celebrate their graduation from the MS Systems Engineering Aviation Systems Track at the March 2024 graduation ceremony. LCDRs Moller and Todd took SE 4353 - Risk Analysis and Management for Engineering Systems from Dr. Van Bossuyt during spring quarter.

Request for Alumni News!
The SE Department is interesting in hearing how our alumni are doing.
Please feel free to send the editor news items for inclusion in future newsletters.

If you would like to subscribe to the Systems Engineering Newsletter, please click here.

Dr. Oleg Yakimenko, Department Chair - oayakime@nps.edu

Dr. Andy Hernandez, Associate Chair for Operations - ahernand@nps.edu

Mark Stevens, Associate Chair for Instruction - mstevens@nps.edu

Dr. Wally Owen, Associate Chair for Distributed Learning & Outreach - wowen@nps.edu

Dr. Warren Vaneman, Deputy Associate Chair for Marketing, Outreach and Engagement - wvaneman@nps.edu

Mark Stevens, Academic Associate 308 Systems Engineering Analysis & 580 Systems Engineering - mstevens@nps.edu

Joel Hagan, Academic Associate 522 Systems Engineering Management - joel.hagan@nps.edu

Dr. Ray Madachy, Academic Associate 311 Systems Engineering (DL) - rjmadach@nps.edu

Dr. Katy Giles, Academic Associate 312 Aviation Systems Engineering (DL) & 711 Systems Engineering Management (DL) - kbgiles@nps.edu

Dr. Kristin Giammarco, Academic Associate 721 Systems Engineering Management (DL) & Program Officer 581, 582 - kmgiamma@nps.edu

Dr. Paul Beery, Academic Associate 722 Systems Engineering Management (DL) - ptbeery@nps.edu

Dr. Douglas Van Bossuyt, Academic Associate 581 Systems Engineering PhD & 582 Systems Engineering PhD (DL) - douglas.vanbossuyt@nps.edu

CDR Caleb MacDonald, Program Officer 380, 580, 522 - caleb.macdonald@nps.edu

Joseph Sweeney, Program Officer 311, 312,711,721,722 - jwsweene@nps.edu

Kathie Cain, Faculty Associate- Education - kmcain@nps.edu

Heather Hahn, Ed Tech Systems Engineering (DL) - hlhahn@nps.edu

Visit Our Systems Engineering Website!