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SE DEPARTMENT NEWSLETTER

January 2016

In This Issue . . .

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- New Faculty in the SE Department
- The SCOOP on what's been happening in Systems Engineering
- Faculty & Staff News





Ronald Giachetti
Department Chair

Robert Harney
Associate Chair for Research

Matthew Boensel
Associate Chair for Operations

Wally Owen
Associate Chair for Distributed Learning & Outreach

Gene Paulo
Associate Chair for Instruction

**Curriculum 308
Systems Engineering Analysis**

Mark Stevens
Academic Associate

LCDR Vince Naccarato
Program Officer

Sandra Stephens
Ed Tech

**Curriculum 311
Systems Engineering (DL)**

Eugene Paulo
Academic Associate

Joseph Sweeney
Program Officer

Heather Hahn
Ed Tech

**Curriculum 580
Systems Engineering**

Mark Stevens
Academic Associate

CDR Michael Porter
Program Officer

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Ed Tech

**Curriculum 721
Systems Engineering Management**

Kristin Giammarco
Academic Associate

Joseph Sweeney
Program Officer

Heather Hahn
Ed Tech

This newsletter is a quarterly publication of the Department of Systems Engineering, NPS. Its contents do not necessarily reflect the official views of the U.S. government, the Department of Defense or the U.S. Navy, nor does it imply endorsement thereof. Information may be subject to change without notice.

Student News

Spring Graduations and Awards



Curriculum 311 –Systems Engineering (DL) September 2015 Graduates

Student Recipients for the Wayne E. Meyer Award for Excellence In Systems Engineering for Outstanding Academic Achievement:

Emmanuel Navedo
John Kevin Manion

Faculty Recipients for the Wayne E. Meyer Award for Excellence in Systems Engineering for Teaching Excellence:

- ◆ Andy Bellenkes
- ◆ Gary Langford

Graduation with Distinction:

- ◆ 311-102W: Bradley May

CALLING ALL ALUMNI
To continue receiving the SE Newsletter, please send your email address to SEDepartment@nps.edu

Professor Cliff Whitcomb Elected INCOSE Fellow

Cliff Whitcomb was elected as a INCOSE Fellow and joins a distinguished group of 73 individuals who contribute to the art and practice of systems engineering. The International Council on Systems Engineering (INCOSE) is the professional society for systems engineering. Cliff Whitcomb was recognized for his significant contributions in teaching, research and curriculum innovation, especially for defense systems. A retired lieutenant commander in the United States Navy and an experienced educator – who has taught at MIT and the University of New Orleans – Whitcomb's graduate programs at NPS have been ranked in U.S. News and World Report's top 25 systems engineering programs. He's authored the book *Effective Interpersonal and Team Communication Skills for Engineers*, and a chapter in *Teamwork and Project Management in Engineering*. Whitcomb also previously sat on INCOSE's board of directors. The award were presented on July 13 at INCOSE's International Symposium, the organization's annual flagship event for systems engineers worldwide. This year's event also marks INCOSE's 25th anniversary.



NPS Research Group ARSENL Breaks UAV Swarm Records

Assistant Professor Timothy Chung and the staff and students of NPS's Advanced Robotic Systems Engineering Laboratory (ARSENL) continue to break records for the number of unmanned aerial vehicles (UAV) swarming in a coordinated manner. At the latest Joint Interagency Field Experimentation (JIFX) exercise at Camp Roberts on May 15th, the ARSENL team simultaneously flew 20 UAVs. On July 23rd they successfully launched 30 UAVs to yet again push the record higher.

"I'm incredibly pleased to share ARSENL's accomplishment of successfully flying 20 UAVs simultaneously last Friday during field experiments at Camp Roberts!" said Chung. "This number beats our previous ARSENL record of 12 UAVs, set in April, and we believe it to be a first-of-its-kind demonstration of this magnitude for large-scale, autonomous fixed-wing UAV teams."



The 20 UAVs were successfully launched and flown autonomously in two "sub-swarms" of 10 UAVs each and guided using ARSENL-developed swarm operator interfaces. Once launched, the UAVs communicate via WiFi links and determine who is the leader with the other UAVs following 50 meters behind.

The team's goal is to deploy 50 UAVs in a swarm. The swarm concept is for many lower-cost UAVs to coordinate their actions to perform various missions for the Navy such as ISR or to be part of a team of manned and unmanned aircraft. The NPS Systems Engineering research is developing the technologies, algorithms, and concepts to advance UAV capabilities.

Further information is available via a NPR article at

<http://www.npr.org/sections/alltechconsidered/2015/07/23/424685529/follow-the-leader-drones-learn-to-behave-in-swarms>

Student News

Fall Graduations and Awards



Curriculum 721

Curriculum 721

Beam, David

Beard, Christian
Bowe, David
Brown, Gregory
Brown, Timothy
Carroll, Rachael
Detwiler, Bradley
Hunt, Spencer
Klopfenstein, John
Krueger, Jodi
Manion, John
McDonald, Karen
Miller, Beth
Pilcher, Joanne
Rivera, Ricardo
Ruppel, Scott
Shattuck, Jeremy
Sparks, Robert
Steward, Victoria
Terwilliger, Katherine
Worden, Kathryn

Curriculum 311

MRP Team
Team Merica
UAV Swarm Team

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LT Andres Otero Selected for CNO Strategic Studies Group

Director of the Chief of Naval Operations Strategic Studies Group (CNO SSG) retired Vice Adm. James P. Wisecup, center, is pictured, Aug. 24, with the recently-selected NPS students who will become CNO SSG Director Fellows. The SSG provides an opportunity for Navy officers to work directly for the CNO on some of the biggest issues facing the Navy. One of the selectees for this year's SSG is **Lt. Andres Otero**, studying in NPS' Department of Systems Engineering. He described the impact he is hoping to have on the Navy and how being a Director Fellow will have an impact on his career. "I think it's a great opportunity to be able to apply real time engineering in a process where the military generally lags," said Otero. "This experience will replace every elevator conversation for the rest of my career. No one is going to ask me about what I did on the Enterprise as a nuke, they are going to ask me about CNO SSG." The SSG XXXV Director Fellows (and alternates) from NPS are U.S. Navy officers Lt. Luis Aybar, Lt. Owen Brooks, Lt. James Carbaugh, Lt. Cmdr. Drew Hall, Lt. j.g. Allison Hogarth, Lt. Kyle Kendall, Lt. Karl Kjono, Lt. Andres Otero, and Lt. Cmdr. Nate Robbins.



NPS Students Build Mission Assurance Tool for National Lab

Article By: MC2 Shawn J. Stewart , May 13, 2015

Pictured are Systems Engineering students Navy Lt. Ross Eldred, Lt. Robert Smith, Lt. Jordan White, Lt. Patrick Stone and Lt. Shannon Buckley at the Roman Plunge Reflecting pool, May 2.

Officials at Los Alamos National Laboratory (LANL) needed a tool to help guide their researchers and scientists through the systems engineering lifecycle process, providing a mechanism for documenting requirements, design, and test results.

“I wanted to give engineers and applied scientist with little or no expertise in system engineering a chance to tailor and apply Los Alamos National Laboratory’s mission assurance processes,” said LANL Executive Advisor, Dr. Heidi Hahn.

She turned to one of the top systems engineering departments in the nation at the Naval Postgraduate School, where a team of students took the challenge for their capstone project, applying a Design Thinking approach to solving the problem.

“The systems engineering capstone project is designed around a three-quarter class structure,” said U.S. Navy Lt. Shannon Buckley, one of the students on the team. “The first quarter consisted of learning about a new procedural engineering [problem solving] concept called Design Thinking. The second and third quarters were focused on accomplishing this project specifically. Design Thinking provided the framework for how we accomplished the task.”

The phases of Design Thinking play out like a Navy Planned Maintenance System where each and every phase has a detailed and clearly defined order of operations. The phases required the students to gather and organize, define issues, ideate, build a prototype and test with users.

NPS systems engineering students, U.S. Navy Lts. Ross Eldred, Robert Smith, Jordan White, Patrick Stone and Shannon Buckley, from left to right, tackled a Design Thinking challenge issued by Los Alamos National Laboratory to develop an easy to use systems engineering approach to lifecycle mission assurance management. “First, we reviewed the problem statement, and then compiled all of the information provided into like-minded groups,” noted NPS student, U.S. Navy Lt. Robert Smith. “We then analyzed the needs, wants, desires, and goals of each group, identifying any similar threads between groups. From there, we discussed how our product could meet the needs of each group.”

“We began brainstorming potential solutions, including different mediums that the formula could take including word documents, paper documents, etc.,” added Navy Lt. Patrick Stone. “We also reviewed alternatives already in place at the laboratory to determine the benefits and drawbacks of each to determine if in-place alternatives could be tailored to fit the design challenge.”

During phase four, students developed a working prototype based on information from the previous three phases. The beta build was developed as a template on Microsoft Word and featured a user-tip protocol. However, user testing in phase five would prove to be difficult.

“The test phase went poorly, but not because of anything the students did or didn’t do,” said Hahn. “We had very low participation by the LANL users who we needed to have test the tool.”

“Testing a prototype from a remote location was very challenging,” added Buckley. “The Design Thinking process is primarily designed around rapid prototyping and testing, however, we were constrained by distance and therefore unable to accomplish the rapid hands-on testing necessary. Fortunately, we were able to obtain a solution through a minimal number of design iterations.”



The SCOOP (SE Conferences, Organizations, and Other Projects)

The distance issue wouldn't last long though. This past February, the students were invited to LANL during their Engineer's Week celebration, and used the visit to present a poster documenting their project. They were finally able to meet users face to face.

"We had a great time at Los Alamos. It was a privilege to interact with so many passionate engineers and scientists," said Lt. Jordan White. "The presentation at Los Alamos was accompanied by a brief from [Systems Engineering] Professor Cliff Whitcomb on the Design Thinking process that was very well received. The lab staff were also engaging and interactive during the presentation and the brief."

Hahn was also excited about the visit and expressed a desire to improve future joint projects.

"I think they had a blast and we very much enjoyed having them. I wish that we had them here longer," she said. "If we do another project, though, we would likely have the students out twice – once at the beginning of the project and again for Engineer's Week."

After a recent review by an Engineering Capability Review Panel, the MAST tool was unanimously praised for its ability to help guide users through mission assurance processes.

"We had an Engineering Capability Review Panel [of external experts] look at various aspects of our mission assurance implementation, including MAST and a LANL-developed requirements generation tool," said Hanh. "The panel liked both and endorsed them to the Director as representing a step toward consistent implementation of our mission assurance framework."

"We have a great sense of accomplishment in knowing that our three quarters of work culminated in a useful asset for the laboratory," added Lt. Ross Eldred. "We have developed a great appreciation for many of the concepts used in Design Thinking and think that the Navy will benefit from Naval Officers learning the process here at NPS. Additionally, interaction with Los Alamos National Laboratory has been an extremely educational and rewarding experience. We would highly encourage future NPS projects and interaction with the laboratory."

Local Engineer Wins Modern Day Technology Leader

David
graduated from the MSSE DL Program, June 2011

Rhodes

FOR IMMEDIATE RELEASE
Release #0712

February 22, 2012
Point of Contact--David Sanders, 832-3611

David Rhodes, of East Providence, R.I., a software engineer in the Sensors and Sonar Systems Department at the Naval Undersea Warfare Center (NUWC) Division Newport, was recently named a winner of the Modern Day Technology Leader Award. He received his award on February 17, 2012, at the Modern Day Technology Leaders Luncheon during the Black Engineer of the Year Science, Technology, Engineering, and Mathematics (STEM) Global Competitiveness Conference in Philadelphia, Pa.

This award, sponsored by U.S. Black Engineer & Information Technology magazine, pays tribute to men and women who are shaping the future of engineering, science, and technology.

Rhodes has worked at NUWC since 2002 and is recognized as a technical expert in the area of submarine combat systems. He serves as a member of the system integration team for the Acoustic Rapid Commercial-off-the-shelf Insertion (ARCI) Program in support of all submarine platforms. His efforts include identifying and investigating interface problems, developing fixes, performing risk assessments, and verifying and validating fixes.

Rhodes earned his bachelor of science in computer science from North Carolina Agricultural and Technical State University and received his master of science in engineering systems from the Naval Postgraduate School.

Winners of the Modern Day Technology Award are selected by a panel of professionals from the Council of Engineering Deans of the Historically Black Colleges and Universities, Lockheed Martin Corporation, and U.S. Black Engineer and Information Technology magazine.

Systems Engineering Research Supports Navy

SE Faculty Warren Vaneman and Kristin Giammarco Develop Architecture for Forward Deployed Energy and Communications Outpost (FDECO)

Warren Vaneman and Kristin Giammarco are part of an Office of Naval Research (ONR) Innovative Naval Prototype (INP) team developing the system concept, architecture, and technologies for FDECO. The purpose of FDECO is to provide a forward-deployed service station for unmanned underwater vehicles (UUV) to dock, recharge, upload data, download new orders, and then continue their mission. The INP team consists of members from Carderock, NUWC, SPAWAR Systems Center Pacific, and NPS. The NPS role being conducted by Drs. Vaneman and Giammarco is to help the team develop a system architectural vision for what is being dubbed the “7-11 for robot subs”.

The teams work is discussed in the article below from Breaking Defense.

<http://breakingdefense.com/tag/fdeco/>

Systems Engineering Research Supports Navy

Faculty Experience the Navy Firsthand Through Scientists at Sea Program By Dale M. Kuska

NPS Department of Information Sciences Research Associate Professor Ying Zhao, third from right, and Lecturer Tony Kendall, third from left, are pictured with fellow scientists on board USS Howard (DDG 83) as they embark for the Scientists to Sea program. The effort provides academics and scientists who work on advanced defense technology with a first-hand view of naval vessels and systems in action.

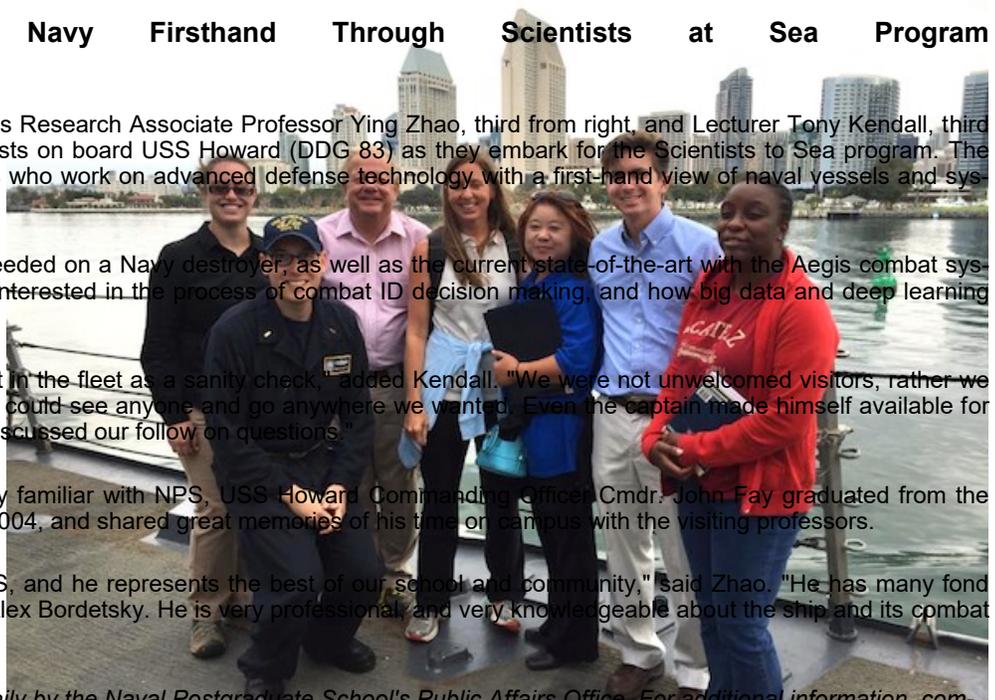
"We were able to see what exactly is needed on a Navy destroyer, as well as the current state-of-the-art with the Aegis combat system," said Zhao. "We were particularly interested in the process of combat ID decision making, and how big data and deep learning might improve the process."

"I think researchers need to be more out in the fleet as a sanity check," added Kendall. "We were not unwelcomed visitors, rather we were part of the Plan of the Day and we could see anyone and go anywhere we wanted. Even the captain made himself available for questions and later even came by and discussed our follow on questions."

The scientists' host on the ship is plenty familiar with NPS. USS Howard Commanding Officer Cmdr. John Fay graduated from the Department of Information Sciences in 2004, and shared great memories of his time on campus with the visiting professors.

"[Cmdr. Fay] is a proud alumnus of NPS, and he represents the best of our school and community," said Zhao. "He has many fond memories of NPS, and his adviser, Dr. Alex Bordetsky. He is very professional and very knowledgeable about the ship and its combat systems aboard."

NPS Photo News items are published daily by the Naval Postgraduate School's Public Affairs Office. For additional information, comments or suggestions, please contact pao@nps.edu.



New Department Chair

Education

Thesis and Capstone projects

- ♦ Matthew Kiefer, Rustin Laycock, Shane Axness, and Thomas Wang, (Cohort 311-133A/Team KLAW), *NPS/NAVAIR Experimental UAS IFC Challenge — Phase III — Bayesian Belief Network Implementation*, March 2015. Project Advisors: Richard Millar and Jeffery Hyink.
- ♦ Peter Shchupak, Study of software tools to support systems engineering management, June 15, 2015. Advisor: Paul Shebalin.
- ♦ Cummings, David J., Survivability as a tool for evaluating open source software, June 15, 2015. Advisor: Chung, Timothy H.
- ♦ Johnson, Jared A. , A determination of the risk of intentional and unintentional electromagnetic radiation emitters degrading installed components in closed electromagnetic environments, June 15, 2015. Advisor: Langford, Gary.
- ♦ Robertson, Chike J. , Applying a system-of-systems engineering perspective to current and future Army Acquisitions, June 15, 2015. Advisor: Giachetti, Ronald.
- ♦ Johnson, Cale , Judy, Brian, Spurr, Nathaniel, Gullede, Joseph, Harris, Paul, Haubold, Kyle, Riner, Jason; Goh, William; Hoo, Yew Kee; Lau, Dylan Zhiliang; Lua, Kwong Yang; Ng, Cheng Leon; Phua, Weiyou; Poh, Yang Sian, Organic over-the-horizon targeting for the 2025 surface fleet, June 15, 2015. Advisor: Chung, Timothy H.



Systems Engineering Students



Faculty Awards





Farewell to Retiring Faculty

David Olwell

By MC2 Shawn J. Stewart

Naval Postgraduate School (NPS) Professor of Systems Engineering (SE) Dr. David H. Olwell will soon be settling in to his new position as Dean of Engineering at Saint Martin's University in Lacey, Washington, but colleagues say he has made a lasting legacy on both the university, and the systems engineering discipline, here at NPS.

"For the 26 years I have been teaching, I've always kept a sign outside my office, a quotation from Douglas McArthur. It reads, 'Your duty remains fixed, inviolate. It is to win our nation's wars,'" said Olwell. "Since 1974, it has been my life's work to contribute to that effort of winning our nation's wars. I consider my teaching years as fighting the very deep battle, helping to shape and strengthen those who will shoulder the responsibilities of our future national defense," he added.

Over the years, the Navy has placed significant value on the study of systems engineering, and Olwell has been deeply involved in evolving the university's program over the years. "When SECNAV [Donald C.] Winter called upon NPS in 2007 to help lead the revitalization of the systems engineering workforce in the Navy, we were positioned and we responded by expanding both the breadth and reach of our educational and research programs," said Olwell

"Working with my colleagues, especially Bob Harney and Chuck Calvano, who had the initial vision for systems engineering at NPS, and Wally Owen, who has been our strong outreach champion, and partnering with other departments at NPS, we built a set of programs that grew from a few dozen students to over 500 students per year," he added.

Posted June 24, 2015

Welcome to New Faculty



Karen Holness Assistant Professor



Joseph Klamo, Assistant Professor

Commander Keller is a native of California and entered the Navy in 1994 after receiving commissioning from San Diego State University Naval Reserve Officer Training Corps program. Following Naval Nuclear Power School in

Faculty and Staff News

Professor Chuck Calvano is the proud grandfather of his first granddaughter (second grandchild). Ayelen Victoria Calvo, 6 lbs., 5 oz., 18 inches, was born on 10 December 2011. You are probably wondering if the last name is a typo, but it is not. Chuck's son-in-law's name differs from his only by the syllable "an". Also, "Ayelen" rhymes with "violin" (without the "V") and is a traditional Peruvian name meaning "joy". Chuck's son-in-law was born in Peru. Congratulations "Papa Chuck"!

Professor Dave Olwell checks in from the University of Hawaii, where he has been spending his ACE Fellowship year. Dave has been learning about the mechanics of major university governance. Topics investigated included managing a board of regents, setting tuition levels, research compliance, research outreach, promotion and tenure policies, relations with the faculty union, relations with the faculty senate, relations with the media, managing an athletic program, fundraising, alumni outreach, hiring, employing a search firm, bonding, articulation agreements, capital facility planning, relations with the legislature, status of research faculty, best practices for Kualii implementation, managing student affairs, IT issues, strategic planning, and last but not least, parking.



Dave has been exploring partnerships with PACOM, UH, and NPS, particularly in the area of biofuels for military use in Hawaii.

Dave has also visited University College London, Imperial College, UH-Hilo, Hawaii CC, CSUMB, MPC, UC Santa Barbara, UC Santa Cruz, Chaminade University, BYU-Hawaii, Ivy Tech, University of Miami, and Stevens Institute. He will visit Hawaii Pacific University, Loyola Marymount, UCLA, USC, Claremont, USNA, USMA, and the Naval War College this spring. His fellowship concludes at the end of this summer.



In case you didn't hear yet, **Kristin Giammarco, Lecturer**, successfully completed her doctoral dissertation defense in outstanding fashion. Her defense was sent out to the the SWE PhD students

via VTC, and was well attended by faculty and students from across campus in person. The SWE program has said that Kristin is the first woman to complete the program, out of about 25 graduates over the life of the program, as well. Congratulations Kristin!

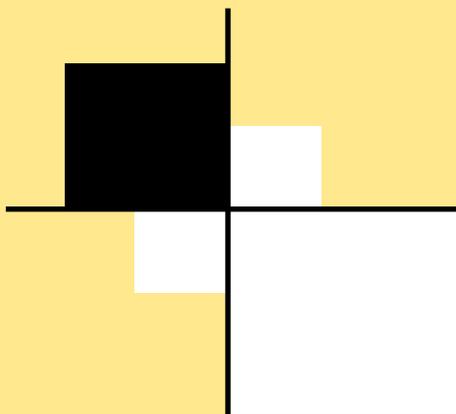
AWARDS of TENURE

were well received and RDML Mahr closely questioned the students' methods and recommendations, closing with a query on what they had gained from the program and project, and noting that similar briefs on future Capstone projects would be appreciated.

Upcoming Conferences & Call for Papers



- April 24-26, 2012 [BKCASE Workshop, NPS, SE \(Dave Olwell/Stephanie Enck\), Monterey, CA](#)
- May 14-16, 2012 [1st Annual Systems Engineering in Washington, DC \(SEDC\), Washington, DC](#)
- May 16-17, 2012 [9th Annual Acquisition Research Symposium, NPS, GSBPP, Seaside, CA](#)
- May 21-23, 2012 [10th Security Workshop, NPS & TDSI \(Tom Huynh\), Monterey, CA](#)
- June 12-14, 2012 [ASNE Mega Rust 2012: Naval Corrosion Conference, San Diego, CA](#)
- July 9-12, 2012 [22nd Annual INCOSE International Symposium, Roma, Italy](#)
- July 16-19, 2012 [IEEE SoSE 2012, Genoa, Italy](#)
- October 14-17 [IEEE International Conference on Systems, Man, and Cybernetics, COEX, Seoul, Korea](#)
- October 22–25, 2012 [15th Annual Systems Engineering Conference, Sponsored by the National Defense Industrial Association \(NDIA\), Systems Engineering Division, San Diego, CA](#)
- November 14-15, 2012 [ASNE Launch & Recovery of Manned & Unmanned Vehicles from Surface Platforms, MITAGS, Linthicum, MD](#)



SE Newsletter Editor

Lori A. Wilson

*Please direct any comments or questions
to lawilson@nps.edu*