The Crow's Nest

Issue 4 November 2022

A Biannual Review of Research & Activities
from the Acquisition Research Program at Naval Postgraduate School

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Program Updates

While there is much to celebrate from the past few academic quarters, our biggest news is a very sad farewell: Rear Admiral Jim Greene, who founded the Acquisition Research Program in 2003, passed away this August. RADM Greene retired from ARP and NPS in 2018 but remained closely connected to the community and committed to the core mission he helped establish: to increase the quantity and quality of scholarly research in acquisition. We are deeply saddened at this loss but also proud to note how his legacy continues to live on, based on the research and activities of NPS faculty and students as well as the hundreds of acquisition researchers in the ARP community who gather together every year at the Annual Acquisition Research Symposium. **Read more** about his legacy with the Navy and at NPS.

This issue compiles many of those accomplishments from the past six months. As the Naval Postgraduate School continues its work to transform to **NPS Next**, ARP has made moves to support this commitment to a 21st-century vision of education and research. We are expanding our impact across campus, particularly with our support for the warrior-scholars enrolled in the Defense Management curricula. Starting with the winter 2022 quarter, all students producing research in one of the five management program areas automatically receive support from ARP. This means we have more great research to share with you, not just in acquisition and contracting, but also in financial management, management and organizations, manpower and economics, and operations and logistics management. This research is also archived in our online **Defense Acquisition & Innovation Repository** **(DAIR)**. DAIR's impact will be expanding next year when it becomes connected to **Project Athena**, an innovative collaborative research tool in the final stages of development with Microsoft and NPS. Athena is a searchable database of ongoing, proposed, and completed research projects as well as relevant news and policy documents. Stay tuned to learn about the launch of this robust research tool.

As you peruse the latest research from our students, you will not be surprised to learn that the Naval Postgraduate School won the **Contract Management Education Award** from the National Contract Management Association (NCMA) for the second time this year. NPS was recognized for its acquisition and contract management curricula, faculty expertise, students' thesis research, and faculty published research. NPS acquisition and contract management degree programs were evaluated on degree graduation requirements, promotion of the contract management profession to its students, course alignment with the standard competencies outlined in the Contract Management Body of Knowledge, and the course impact on students' understanding of contract

management. ARP is thrilled to be a key part of how NPS improves the Contract Management profession through education.

Faculty in the Department of Defense Management are of course key to this successful educational program, which benefits from the prolific, innovative research they produce. This issue showcases funded research on topics including workforce competencies, cybersecurity, portfolio management, and the impact of continuing resolutions, as well as diverse publications in peer-reviewed journals. Two NPS faculty teams have completed the first phase of their research sponsored by the Acquisition Innovation Research Center, with plans for continuing the work in a second phase. These projects connect emerging technology and technological concepts with acquisition processes: Dr. Daniel Finkenstadt's team has developed several applications of gaming technology for acquisition training and decision making. Dr. Johnathan Mun has continued his work creating robust modeling tools, this time developing a model to collect and coordinate data that informs acquisition decisions so that future acquisition planners can more readily turn to historical data to make faster and better strategies for complex purchases.

As we look forward to 2023, we are preparing to celebrate 20 years of hosting the Acquisition Research Symposium, and we're delighted that we will be welcoming all presenters back to Monterey, California. This will be our first hybrid event, with some panels streamed to remote attendees. Happy hours are only for those onsite—always an incredible opportunity to network, collaborate, and continue conversations with fellow acquisition nerds. We've got some special events in the works for this milestone, so make plans now to join us.

Sincerely,

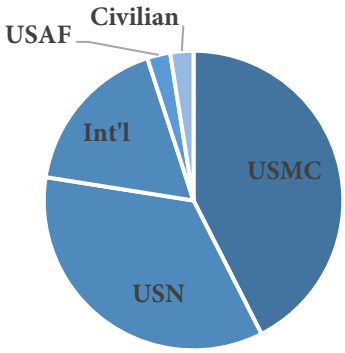
Karey Shaffer, MBA
ARP Program Manager

Robert Mortlock, Ph.D.
ARP Principal Investigator
Professor of the Practice

Student Spotlight

March 2022 Graduates, Theses, & Awards

In March, 40 students graduated from the Department of Defense Management and were supported by ARP. Seventeen of these students came from the U.S. Marine Corps, 14 from the U.S. Navy, 7 are international military service members, 1 from U.S. Air Force, and 1 civilian. Working individually or on teams, these students produced 38 thesis reports and garnered five awards.



Awards

Five students were recognized for excellence with awards from the Naval Postgraduate School, Naval Supply Systems Command, the Surface Navy Association, Marine Corps Association, and Chief of Naval Personnel:

Squadron Leader Ryan Ashen, Royal Australian Air Force and CPT John O'Keeffe, Australian Army
Award: The Department of Defense Management Faculty Outstanding International Student Award

Thesis: **Family Ties: The Relationship Between Family and Workforce Behaviors (Retention, Separation, and Re-entry) in the Royal Australian Air Forces Officer Aviation Workforce**
— *Advisors: Dr. Jennifer Heissel and Dr. Erik Helzer*

LT Judith Cho, USN
Award: The Surface Navy Association's Award for Excellence in Surface Warfare Research

Thesis: The State of the Warfighter Mentality in the Surface Warfare Officer Community
— *Advisors: Dr. Paul Lester and Dr. Mie-Sophia E. Augier*

LT Anna Dolgova, USN
Award: Chief of Naval Personnel Award for Academic Excellence in Manpower Systems Analysis

Thesis: **Geographical Variations in Mental Health Resource Capacity at the Military Treatment Facilities**
— *Advisors: Dr. Yu-Chu Shen and Dr. Marigee Bacolod*

CAPT Michael Gannon, USMC

Award: Marine Corps Association Superior Service Award for Outstanding U.S. Marine Student

Thesis: **Modeling System Behavior of Individual Procedures at the Tactical Level of the Marine Corps Human Resource Development Process—do HRDP Policy, Procedures, and IMS Support or Hinder Themselves?**

— Advisors: Dr. Chad Seagren and Vivienne Ming

MAJ Michael Hanlon, USMC

Award: Chief of Naval Personnel Award for Academic Excellence in Manpower Systems Analysis

Thesis: **Tuition Assistance: Effect of Policy Change on Usage in the Marine Corps**

— Advisors: Dr. Sae Young Ahn and Dr. Latika Hartmann

Other Theses

Listed below by topic area.

ACQUISITION MANAGEMENT

A Time Series Analysis of Australian Regular Army Enlisted and Officer Separations

MAJ Timothy Darragh, Australian Army

Advisors: Dr. James Fan and Dr. Simona Tick

An Exploratory Analysis of the Feasibility of Developing a Combat Medic Primary Military Occupational Specialization Within the USMC

LT Kenneth M. Gill, USN

Advisors: Dr. Yu-Chu Shen and Dr. Chad Seagren

Retention in the Royal Australian Air Force Aviation Technical Workforce: Is it Changing and how Feasible is the Future Demand?

CAPT Gillian Carr, Royal Australian Air Force

Advisors: Dr. Chad Seagren and Mark Powell

Who Sings the Baby Blues? Changes in Mental Health and Retention Among Parents in the Military

LT Megan M. Ellington, USN

Advisors: Dr. Jennifer Heissel and Olivia Healy

COST ESTIMATION

Cost as a Factor in China's Research, Development, and Acquisition (RDA) Cycles and Decision-Making
Capt Adam J. Dickson, USMC
Advisors: Raymond D. Jones and Dr. Simona Tick

Cost-Benefit Analysis of Marine Corps Operational Support Airlift: Alternative Acquisition and Force Structures for Marine Corps Operational Support Airlift
Capt Jerett D. Fazendine, USMC
Advisors: Dr. Simona Tick and Raymond D. Jones

A Cost-Effectiveness Analysis of C-12 Variant Airborne ISR Capabilities in the Marine Corps
Maj Paul P. Moreau, USMC
Advisors: Dr. Chad Seagren and Dr. Ryan Sullivan

FINANCIAL MANAGEMENT

Understanding Bitcoin and its Utility for Special Operations Forces
LT Michael C. Pero, USN
Advisor: Dr. Amilcar A. Menichini

HUMAN RESOURCES

An Analysis of Navy Nurse Corps Specialties and the Effects of Civilian Market Wages on Retention
LT Mary K. Looker, USN
Advisors: Dr. Sae Young Ahn and Dr. Latika Hartmann

Analyses of Female Participation in United Nations Peacekeeping Operations
LT Verry I. Budhi, Indonesian Navy
Advisors: Dr. Elizabeth Gooch and Tammy Lowery

Assessing The Impact of Recognition on the Retention of Royal Australian Air Force Personnel
CPT Daniel Tyson, Royal Australian Air Force
Advisors: Dr. Sae Young Ahn and Dr. Simona Tick

Can-Do Vs. Will-Do Factors: Predicting the Gold-Standard Marine
Maj Joshua B. Welch, USMC
Advisors: Dr. Marigee Bacolod and Dr. Erik Helzer

Examining the Relationship Between Undergraduate Education and Performance, Misconduct and Retention in Active Duty U.S. Marine Corps Personnel
GySgt Brandon E. Smart, USMC
Advisors: Dr. Erik Helzer and Dr. Jennifer Heissel

Fit v. Fat: Reevaluating the USMC Body Composition Program to Increase Accuracy and Optimize Long-Term Performance
Maj Cristina Lopez, USMC
Advisors: Dr. Jennifer Heissel and Dr. Chad Seagren

Full-time Vs. Part-time: An Evaluation of the Competitiveness of Reserve Officers by Commissioning Source
Maj Michael S. Becker, USMC
Advisors: Dr. Marigee Bacolod and Dr. Latika Hartmann

Impacts of Participating in the Australian Defence Force Cadets
MAJ John O'Keeffe, Australian Army
Advisors: Maxim Dr. Massenkoff and Dr. Yu-Chu Shen

Improving the Navy's Performance Evaluation System with Successful Practices
LT Matthew H. Faber, USN
Advisors: Dr. Latika Hartmann and Dr. Sae Young Ahn

Joint Professional Military Education: The Impact of Broadened Learning on Medical Staff Officers
CDR Kenneth R. Jenkins, USN
Advisors: Dr. Simona Tick and Dr. Mie-Sophia Augier

Leadership to Enable 21st-Century Teams to Solve Ill-Structured Problems
Maj Jordan D. Miller, USMC
Advisors: Dr. Erik Helzer and Dr. Mie-Sophia Augier

Leads vs. Canvassing: Predicting Quality and Attrition of Enlistees by Recruiting Source
Maj Thomas J. Goodman, USMC
Advisors: Dr. Simona Tick and Dr. Chad Seagren

Parenthood, COVID-19, and Work Outcomes in the DoD
Maj Yuk W. Kwan, USMC
Advisors: Dr. Maxim Massenkoff and Dr. Jennifer Heissel

Performance Evaluation Trait Validation
LTJG Bryan C. Luke, USN
Advisors: Dr. Marigee Bacolod and Dr. Erik Helzer

Racial Inequities in the Navy's Criminal Justice System: An Empirical Analysis of Racial Disparities at Non-Judicial Punishment
LT Dennis Barrett, USN
Advisors: Dr. Latika Hartmann and Dr. Simona Tick

Recruitment Potential: "Sailors" Who have Never Seen the Ocean
LCDR Charles K. Kollar, USN
Advisors: Dr. Simona Tick and Dr. Maxim Massenkoff

Telework within Department of the Navy Shore Commands: Recommendations from History and Analysis of Industry and Academic Literature
LT Kuran W. Bricker, USN
Advisors: Dr. Latika Hartmann and Dr. Sae Young Ahn

The Effects on U.S. Navy Diversity with the Removal of Officer Photos from Promotion Selection Boards
LCDR Jessie N. Peralta, USN
Advisors: Dr. Sae Young Ahn and Dr. Marigee Bacolod

The Impact of a Quality Undergraduate Education on Marine Corps Officer Performance
Maj Nicholas S. King, USMC
Advisors: Dr. Chad Seagren and Dr. Simona Tick

The Infantry Maturity Quotient: An Analysis of the Manpower Effects of Maturing the Marine Infantry
Maj Matthew D. Tweedy, USMC
Advisors: Dr. Marigee Bacolod and Dr. Chad Seagren

We don't need no Education: Effects of Degree Masking on Air Force Officer Promotion Outcomes
Capt. Katharine Albright, USAF
Advisors: Dr. Maxim Massenkoff and Dr. Marigee Bacolod

What is Fit? The Misconception of Fitness and Fatness: A Review of Body Composition Standards and Physical Readiness Policy Alternatives for the U.S. Navy
LT Ollieanna P. Burke, USN
Advisors: Dr. Jennifer Heissel and Dr. Chad Seagren

LOGISTICS MANAGEMENT

An Atlas for Navigating the Innovation Ecosystem: Hybrid Airships as a Use Case to Engage the Commercial Sector
Capt John D. Schmaltz Jr, USMC and Capt Benjamin T. Cohen, USMC
Advisors: Dr. Eva Regnier and Dr. Nicholas Dew

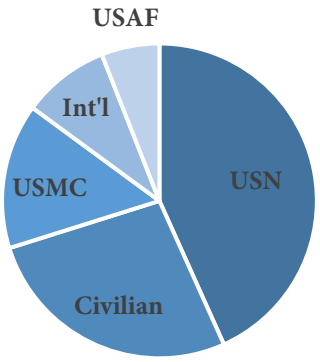
Equipping The NMESIS Battery
Maj Scott J. Weibling, USMC
Advisors: Dr. Chad Seagren and Dr. Aruna Apte

PROGRAM MANAGEMENT

An Empirical Evaluation of Navy METOC Projects using Project Management Standards
Elizabeth Rhodus, Civilian
Advisors: Dr. Robert F. Mortlock and Dr. Nicholas Dew

June 2022 Graduates, Theses, & Awards

In June, 67 students graduated from the Department of Defense Management and were supported by ARP. Twenty-nine of these students came from the U.S. Navy, 18 are civilians, 10 from U.S. Marine Corps, 6 are international military service members, and 4 from U.S. Army. Working individually or on teams, these students produced 41 thesis reports and garnered nine awards.



Awards

Nine students were recognized for excellence with awards from the Naval Postgraduate School and Naval Supply Systems Command:

LCDR Francisco Degollado, USN
Award: Naval Supply Systems Command Award for Academic Excellence Management

Thesis: Navy Global Multi Award Contract Effects of Competition on Pricing of Port Visits
- With co-authors LCDR Ryan Cahill and LCDR Bryan Ortiz, USN
- *Advisors: Dr. Robert F. Mortlock and Dr. Geraldo Ferrer*

LCDR Amy Hutchings, USN
Award: Commander Philip A. Murphy-Sweet Memorial Award for Excellence in Acquisition

Thesis: **Has Department of Defense Acquisition Reform Policy Addressed the Problems Facing Acquisitions Professionals?**
— *Advisors: Raymond Jones and Dr. Robert F. Mortlock*

LCDR Sohaib Leghari, Pakistan Navy
Award: RADM Donald R. Eaton Logistics Award for Outstanding Achievement

Thesis: **An Internet of Things (IoT) Based Approach to Innovate Canteen Stores Department's Retail Operations**
— With co-authors LTC Hafiz Kashi Rashid, Pakistan Army and WGCDR Kashif Kamal, Pakistan Air Force
— *Advisors: Dr. Robert F. Mortlock and Raymond D. Jones*

LCDR Hayato Kakiuchi, Japan Maritime Self-Defense Force and **LCDR Edwin J. Liwanagan, Philippine Navy**
Award: RADM Donald R. Eaton Logistics Award for Outstanding Achievement

Thesis: **An Analysis of Philippine and Japanese Naval Assets for Humanitarian Assistance and Disaster Relief (HADR) Operations**
– *Advisors: Dr. Aruna. Apte and Dr. Kenneth Doerr*

Captain Ilias Papapostolou, Hellenic Army
Award: The Department of Defense Management Faculty Outstanding International Student Award

Thesis: **The Role of Leadership in Corruption and Misconduct Scandals in the U.S. Military**
— *Advisors: Dr. Paul Lester and Bryan Hudgens*

Maj. Jordan Pierce, USMC
Award: Rear Admiral Thomas R. McClellan Award for Academic Excellence in the Department of Defense Management

Thesis: **Comparative Case Study: Expeditionary Fighting Vehicle and Amphibious Combat Vehicle**
— *Advisors: Dr. Robert F. Mortlock and Dr. Deborah E. Gibbons*

Capt John D. Schmaltz Jr, USMC and **Capt Benjamin T. Cohen, USMC**
Award: Distinguished Professor Kenneth J. Euske Dean's Medal for Innovative Contribution to National Defense, Department of Defense Management

> **Thesis**: **An Atlas for Navigating the Innovation Ecosystem: Hybrid Airships as a Use Case to Engage the Commercial Sector**
> — *Advisors: Dr. Eva Regnier and Dr. Nicholas Dew*

Other Theses

Listed below by topic area.

ACQUISITION MANAGEMENT

The Army Combat Cloth Face Cover
LTC Jamiah Edwards, USA and CPT Elena Melillo, USA
Advisors: Dr. Robert F. Mortlock and Jeffrey R. Dunlap

Analysis of Small Business Participation in Online Marketplaces
Brooke Ballenger, Civilian; Geneva Oakes, Civilian and Allison Strong, Civilian
Advisors: Jeffrey R. Dunlap and Kristofer Parker

Analysis of Possible Solutions to Support the Timely Delivery of the Columbia Class Submarine
LT Benjamin Field, USN
Advisors: Dr. Robert F. Mortlock

Comparison of the Watchstanding, Training, and Maintenance Processes Between the U.S. Navy Fleet and the U.S. Merchant Marine
Marjan Martinovic, Civilian
Advisors: Dr. Deborah Gibbons and Dr. Robert F. Mortlock

Disconnected From the Front Lines: Lack of Warfighter Experience in Acquisitions Yields Unacceptable End States
LCDR Thompson E. Kunz, USN, CDR Adam R. Pawlak, USN, and CWO3 Wayne Westfall, USN
Advisors: Dr. Deborah Gibbons and Dr. Robert F. Mortlock

Downstream Benefits of Retrofitting Aged DoD Building Stock with a Focus on Increasing Building Envelope Efficiency
LT Shawn D. Reed, USN
Advisors: Kristen Fletcher and Dr. Amilcar A. Menichini

Exploring Productivity and Workplace Satisfaction Outcomes for Employees Participating in Telework at the Air Force Acquisition Management and Integration Center (AMIC)

Shelby A. Ramirez, Civilian
Advisors: Dr. Kathryn J Aten and Dr. Mitchell Friedman

Marine Corps Contracting Officer Career Pathway: Restructure Mos Designation System to Support and Improve the Service's Acquisition Workforce

Lt Col Pamela Unger, USMC
Advisors: Jeffrey Dunlap and Wynndee Young

Marine Corps Training for Success in Littoral Combat: What Does a Service-Level Training Exercise Look Like for a Marine Littoral Regiment?

Maj Martin O. Thomas, USMC
Advisors: Dr. Mie-Sophia Augier and William Mullen

Navy Auxiliary System Acquisition Analysis

Raymond Belko, Civilian
Advisors: Dr. Robert F. Mortlock and Raymond D. Jones

ORB Impact on Officer Retention in the Navy Explosive Ordnance Disposal (EOD) Community

LT Daniel R. Marriott, USN
Advisors: Dr. Amilcar A. Menichini and Dr. Sae Young Ahn

The Government Funding Appropriation Process and its Inability to Keep Up with Software and Digital Technology

Allison A. Calabria, Civilian
Advisors: Dr. Robert F. Mortlock and Jeffrey Dunlap

The Rational Behavior Theory of Small Businesses in the National Capital Region: A Mixed-Methods Study on Participation in Economic Intervention and Prevention Strategies Under the Cares Act

Sonji A. Epps, Civilian
Advisors: Kelley Poree and Dr. Mitchell Friedman

CONTRACT MANAGEMENT

An Evaluation of Better Pricing Under Competitive Contracting Procedures for NAVWAR and NIWC Pacific Advisory and Assistance Services

Bryan F. Boardway, Civilian and David M. Roden, Civilian
Advisors: Kelley Poree and Bryan Mansfield

Analysis of the 2021 Office of Federal Procurement Policy Definition of Procurement Acquisition Lead Time
Kimberlee K. Lowry, Civilian and Melissa A. Droeske, Civilian
Advisors: Kelley Poree and Dr. Thomas D. Robinson

The Analysis of the Closeout Process and Recommendations for Reducing Backlog
MAJ Elizabeth A. St. Peter, USA and MAJ Charmayne E. Hall, USA
Advisors: Brett M. Schwartz and Ned Stephens

Perceptions on the Feasibility of Implementing Innovative Cost and Price Analysis Software across Naval Sea Systems Command
Zachary Cooper, Civilian
Advisors: Kelley Poree and Erin Anderson

FINANCIAL MANAGEMENT

Analysis of the Scale of Annual Appropriation Returned to the U.S. Treasury
Laura Maple, Civilian and Maj. John Pomy, USMC
Advisors: Dr. Robert F. Mortlock and Raymond D. Jones

An Analysis to Lengthen Operation and Maintenance Budget To 2-Year and Allow a Carryover of Expired Funds to The End of The First Quarter of The Subsequent FY
LCDR Ailoune Diop, USN
Advisors: Dr. Ryan S. Sullivan and Dr. Chong Wang

An Examination of Cost Sharing Between the Department of Defense and Servicemembers
LCDR John A. Sison, USN
Advisors: Philip J. Candreva and Dr. Simona Tick

Employing Markov Models to Forecast the End Strength of the US Navy Supply Corps Financial Management (3111) Community
LCDR Brett R. Jacobs, USN, LCDR Michael A. Curtis, USN and LCDR Dartanyon R. King, USN
Advisors: Dr. Robert F. Mortlock and Raymond D. Jones

Funny Money: An Analysis of OPTAR Fraud, Waste, and Abuse in the U.S. Navy
LCDR Gamalier Riverafontan, USN and LCDR David A. Dyal III, USN
Advisors: Juanita Rendon and Dr. Chong Wang

HUMAN RESOURCES

Bias Against Women and Minorities in the United States Marine Corps Awards and Decorations Program
Maj Daniel Gonzalez, USMC
Advisors: Dr. Paul Lester and Dr. Erik Helzer

Blended Learning Strategies: Opportunities and Limitations of Using YouTube Videos to Support Ready Relevant Learning
LCDR David L. Aguilar, USN and LT Ryan J. Wickham, USN
Advisors: Dr. Kathryn Aten and Dr. Simona Tick

Female Retention in the U.S. Navy Supply Corps
LCDR Jami Garrett, USN and LCDR Madeleine Fuentes, USN
Advisors: Dr. Latika Hartmann and Dr. Erik Helzer

Impact of Mental Health-Related Unplanned Losses Onboard Surface Ships
LT Myisha A. Bryan, USN and LT James M. Snead, USN
Advisors: Dr. Amilcar Menichini and Douglas Jones

Improving Internship Program and Intern Retention at Naval Surface Warfare Center Port Hueneme Division Contracting Office
Brian A. Carpenter, Civilian and Demi Degarmo, Civilian
Advisors: Dr. Mitchell Friedman and Eric Ford

INFORMATION TECHNOLOGY

Exploration of Software License Management Methods in Government Enterprises
Capt James A, Hughes, USMC
Advisors: Anthony Canan and Glenn Cook

LOGISTICS MANAGEMENT

An Analysis on the Effects of Additive Manufacturing (AM) on F/A-18E/F Readiness
LCDR Branden Albrecht, USN; LT Raphael Erie, USN and LT Jacob Skipper, USN
Advisors: Dr. Geraldo Ferrer and Dr. Margaret M. Hauser

Inventory Accuracy of Maintenance Assistance Modules (MAMS) on Ships Utilizing the Organizational Maintenance Management System - Next Generation (OMMS-NG)
LCDR Joshua Hart, USN; LCDR Jonathan Herrick, USN and Elliot Torresrivera, USN
Advisors: Raymond D. Jones and Dr. Robert F. Mortlock

PROGRAM MANAGEMENT

Developing a Project Manager Competency Model to Better Serve the Warfighter and the DoD
Justin Hughes, Civilian and Daniel Flanigan, Civilian
Advisors: Dr. Robert F. Mortlock

SYSTEMS ENGINEERING

Adoption of Digital Twin Within the Department of the Navy
Capt Morgan B. White, USMC and Capt Steven M. Ellington, USMC
Advisors: Anthony Canan and Glenn Cook

How Improved Corrosion Control Practices in the U.S. Navy's Arleigh Burke Class Destroyer Engineering Spaces Might Enhance Ship Efficiency While Operating
LT Justin R. Pratt, USN
Advisors: Dr. Chad Seagren and Bryan Hudgens

TEST AND EVALUATION

Use of Fleet Aviation Electronic Attack Squadrons for Operational Test and Evaluation of Next Generation Jammer Mid-Band (ALQ-249) Program
LCDR Gabriel Duran, USN
Advisors: Dr. Robert F. Mortlock

NPS Student Recognized as Outstanding Airmen of the Year: Master Sgt. Kade N. Forrester

Master Sgt. Kade N. Forrester, the infrastructure flight section chief for the 11th Contracting Squadron at Joint Base Anacostia-Bolling, D.C., was recognized as one of the Air Force's 12 Outstanding Airmen of the Year for 2022. Forrester's acumen was exemplified when he launched a $111 million Simplified Acquisition Base Engineer Requirements (SABER) program. By finding creative solutions to source products and contractors, Forrester's SABER plan slashed acquisition timelines by 70 percent on 24 highly visible projects and saved more than 1,000 labor hours across the wing. The plan was critical for getting the base to FOC by 2022.

His leadership and innovation also earned him the Department of Air Force's Contracting Ninja of the Year and Air Force District of Washington Innovation in Contracting Individual of the Year Awards in 2021.

Forrester is currently on assignment at the Naval Postgraduate School pursuing a master's degree in contract management.

Events

20th Annual Acquisition Research Symposium

The Naval Postgraduate School announces the 20th Annual Acquisition Research Symposium to be held May 10-11, 2023, as a hybrid event.

We are thrilled to celebrate our 20th year of hosting this event by welcoming you back to beautiful Monterey, California. All presenters, panelists, and chairs must attend the event in person. Some sessions will be livestreamed for online attendees.

Today's naval, military, and government leaders need to **understand both the latest technological capabilities and the acquisition processes** that can develop and deliver those capabilities to the warfighter.

- We encourage presentations, panels, and conversations that bridge these two worlds of expertise to accelerate defense innovation.

Transform your research into fielded capabilities that improve warfighting effectiveness.

- Present at the symposium!

Proposals are due November 29, 2022.

Learn more at the symposium website: www.researchsymposium.com

WHAT IS THE ANNUAL ACQUISITION RESEARCH SYMPOSIUM?

Since 2003, the symposium has been the premier event connecting acquisition professionals from across disciplines and around the world.

- Senior acquisition officials from the Departments of Defense and the U.S. Navy serve as panel chairs and present their critiques and comments on research papers and priorities.

- Many attendees are Naval Postgraduate School faculty and graduate students engaged in acquisition-related research.

The 2022 symposium featured keynote speakers **Mr. Andrew Hunter**, Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics and **Mr. Tommy Ross**, Chief of Staff, Office of the United States Navy, Performing the Duties of Assistant Secretary of the Navy for Research, Development and Acquisition.

- **View our collection** of papers and presentations from this year's event to learn more.

Leaders kick off the virtual 2022 symposium with welcomes, introductions, and the keynote address. Pictured (clockwise from top left): ARP Principal Investigator Robert Mortlock, the Honorable Andrew Hunter, NPS President Ann Rondeau, and NPS Acquisition Chair David Lewis.

WHAT KIND OF RESEARCH CAN I PRESENT?

The following list of topics is provided to indicate the range of potential research areas of interest for this symposium: acquisition innovation, acquisition workforce and culture, the adaptive acquisition framework, artificial intelligence/machine learning/natural language processing, budgeting/cost estimating/financial management, command and control/JADC2, contract management, cybersecurity, data analysis and architecture, digital engineering, emerging technologies, industrial base, logistics, policy analysis, program management, requirements generation/the JCIDS process, supply chain management, systems engineering, shipbuilding, space acquisition, and sustainment.

The Symposium Program Committee notes the urgent need for today's naval, military, and government leaders to **understand both the latest technological capabilities and the acquisition**

processes that can develop and deliver those capabilities to the warfighter. We encourage presentations, panels, and conversations that bridge these two worlds of expertise to accelerate acquisition innovation.

HOW DO I SUBMIT?

Your submission must include **an abstract** with enough detail to be selected by the evaluation committee, **research issue and results statements,** and **keywords**. The proposal should indicate the relevance of this research to larger issues in the acquisition community.

- **For papers**, plan for a 15-minute presentation.
- **For a panel**, plan for a 75-minute duration with no more than 5 people. Usually a panel has a chair and three research papers **OR** a chair, discussant, and two research papers.

Proposals must be submitted by November 29, 2022.

WHAT HAPPENS AFTER I SUBMIT?

- **Notifications** of accepted proposals will be sent by **December 16, 2022**.
- If your proposal is accepted, **papers must be submitted by April 6, 2023** to be included in the proceedings.

Presenters, panelists & chairs must attend the event in person.

Please send questions/inquiries to arp@nps.edu.

Collaborations

Special Section of Naval Engineers Journal—NPS 19th Annual Acquisition Research Symposium

The September 2022 issue of *Naval Engineers Journal* features a special section with curated articles from the 2022 symposium. Articles are introduced by VADM (Ret.) David H. Lewis, NPS Acquisition Chair, and include three papers from symposium participants:

- **A Case for Continuous Concept Development in Ship Design**
  CDR Jonathan Page, USN
- **Determining a Digital Engineering Framework: A Systemic Review of What and How to Digitalize**
  Stephen M. Waugh
- **Understanding Post-Production Change and Its Implication for System Design: A Case Study in Close Air Support During Desert Storm**
  Aditya Singh, Zoe Szajnfarber

From VADM Lewis's introduction:

This is the third year that the Naval Postgraduate School's Acquisition Research Program (ARP) has partnered with Naval Engineers Journal to publish select papers from our Annual Acquisition Research Symposium. We are grateful for this collaboration, which highlights how critical it is for the engineering and acquisition research communities to be in conversation with each other. **ARP enables research in engineering and design innovation** for modern complex systems through better acquisition processes, and our symposium brings together thought leaders in this area from across the Navy, academia, and industry.

Read the full issue.

ARP-Administered Research Grants

Grants

The following paper published in 2022 began with support from grants ARP administered on behalf of the Office of the Under Secretary of Defense for Acquisition and Sustainment:

Exploring Blockchain Adoption Supply Chains: Opportunities and Challenges

Adrian V. Gheorghe, Omer F. Keskin, Farinaz Sabz Ali Pour, and Unal Tata, Old Dominion University

In modern supply chains, acquisition often occurs with the involvement of a network of organizations. The resilience, efficiency, and effectiveness of supply networks are crucial for the viability of acquisition. Disruptions in the supply chain require adequate communication infrastructure to ensure resilience. However, supply networks do not have a shared information technology infrastructure that ensures effective communication. Therefore decision-makers seek new methodologies for supply chain management resilience. Blockchain technology offers new decentralization and service delegation methods that can transform supply chains and result in a more flexible, efficient, and effective supply chain.

This report presents a framework for the application of Blockchain technology in supply chain management to improve resilience. In the first part of this study, we discuss the limitations and challenges of the supply chain system that can be addressed by integrating Blockchain technology. In the second part, the report provides a comprehensive Blockchain-based supply chain network management framework. The application of the proposed framework is demonstrated using modeling and simulation. The differences in the simulation scenarios can provide guidance for decision-makers who consider using the developed framework during the acquisition process.

Faculty Research & Publications

Research sponsored by the Acquisition Research Program continues to make significant contributions to how we understand the data, people, and culture of defense acquisition. Since January we have celebrated numerous successes from NPS faculty who are in the Department of Defense Management, have been supported by ARP, or both.

Faculty Technical Reports Sponsored & Published by ARP

From January to September 2022, ARP supported and published eight technical reports from faculty in the Department of Defense Management and the Department of Information Sciences at Naval Postgraduate School. These reports can be found online in ARP's Defense Acquisition & Innovation Repository.

Cybersecurity, Artificial Intelligence, and Risk Management: Understanding Their Implementation in Military Systems Acquisitions

Johnathan Mun and Thomas Housel, Naval Postgraduate School
Funded by Program Executive Officer, Integrated Warfare Systems (PEO IWS)

The exponential growth in data management has led to explosive growth in data analytics, big data, machine learning (ML), and artificial intelligence (AI). Despite the positive effects these emerging solutions have on productivity, there is a desperate need for information on extreme risk factors (e.g., climate change, pandemic risks, data loss, failure of information technology systems) impacting cybersecurity. We conducted a systematic review on how AI, especially ML, is being considered in military acquisitions, including discussions around risk management and extreme events in order to identify how the Department of Defense could use these findings to increase awareness of the hidden aspects of ML and AI, especially in the face of extreme events.

Individualized and Optimal Talent-Management of the AWF in Response to COVID-19: Dynamic Programming Approach

Sae Young (Tom) Ahn and Amilcar Menichini, Naval Postgraduate School
Funded by Director, Acquisition Talent Management (DATM), Department of the Navy

This report is an extension of the originally proposed sequence of three studies that developed a cutting-edge modeling and simulation tool for the Acquisition Workforce (AWF). The initial objective of that sequence was to build a Dynamic Retention Model (DRM) from the ground-up for the AWF to restore and maintain a capable and flexible acquisition workforce in support of the needs of the modern warfighter. The current report uses the previous model to analyze the phenomenal and unprecedented

impact of COVID-19 pandemic on the U.S. civilian sector and its potential effects on the size and composition of the AWF in the coming years.

The main effect of the COVID-19 shock is to make the AWF job temporarily more attractive than a similar job in the private sector, inducing the AWF worker to stay much longer in the government. Not surprisingly, the initial higher valuation of the AWF job compared to the private sector quickly dissipates, and AWF attrition rates surge above pre-pandemic levels as employees who were planning to move to the private sector (and froze their plans due to the pandemic) resume their original courses of action. An important take-away is that, while the COVID-19 shock may initially induce more employees to stay longer in the AWF, it is not a permanent solution to retain valuable workers. To this end, traditional personnel policy actions will be required by the AWF leadership. We conclude the report by describing different possibilities to continue extending the model even further. These extensions will augment the DRM to provide the AWF leadership more accurate and powerful predictions of future AWF worker behavior.

Machine Learning in AWF Talent Management: New Approaches to Prediction of Workforce Retention and Promotion

Sae Young (Tom) Ahn and James Fan, Naval Postgraduate School
Funded by Director, Acquisition Talent Management (DATM), Department of the Navy

The Department of Navy (DoN) and Department of Defense (DoD) Acquisition Workforce (AWF) Strategic Plans call for a restoration and strengthening of the civilian AWF after more than two decades of contraction. To achieve strategic talent management of the workforce, it is critical to have the ability to predict which workers are most likely to leave the AWF. This technical report is the first to evaluate whether Machine Learning (ML) can be a useful tool for the AWF leadership to make attrition forecasts. We first show that ordinary least squares (OLS), which is the tool most-often associated with statistical modeling of worker behavior, performs poorly, especially given the sparse administrative dataset we have access to. We then test a variety of ML algorithms and find that they can predict worker attrition with a higher degree of accuracy. Our conclusion from this exploratory analysis is that, as algorithmic effectiveness increases with dataset size (in terms of more worker and job/task characteristics), there may be many use cases for these algorithms in future predictive modeling for manpower and retention. Forecasting attrition will aid the leadership by identifying 1) which workers to target for retention via incentives and 2) which areas will need to increase or decrease recruitment to quickly fill personnel gaps that may arise.

An Assessment of the Impact of Federal Continuing Resolutions on the Pre-Approval Stage of Defense Acquisitions

Spencer T. Brien, Naval Postgraduate School
Funded by Director, Acquisition Talent Management (DATM), Department of the Navy

This study is an analysis of the impact of federal continuing resolutions on defense acquisitions. It focuses on the early stage of the acquisitions lifecycle when purchase requests are prepared and submitted to the acquisitions system. The research objective is to quantify the impacts of continuing resolutions on the number of purchase requests created, the processing period for acceptance of purchase requests into the acquisition system, and the total dollar amount of purchase requests. The analysis used data taken from the USMC Purchase Request Builder system, a database for purchase order creation prior to a request's acceptance into the acquisitions system. The sample obtained describes over 1,000 unique purchase requests generated between FY16 through FY19.

The results show that the weekly average number of requests generated is reduced by nearly half during a continuing resolution. The regressions using the count of purchase requests per week also revealed strong impacts on purchase requests for both goods and services, though the impact may be greater on service requests. The lack of budget authority is associated with a reduction in the size of individual requests, and this effect disproportionately effects service requests. Our analysis of PRALT length, the time required for a request to advance from initial creation to acceptance in the procurement system, was initially significant, but ultimately could not be distinguished from seasonal trends. Overall, this study is one of the few empirical exercises to date that measure the impact of continuing resolutions on defense procurement. The estimates generated from this analysis identify clear impacts on procurement activity that results from the uncertainty and increased administrative burden that is triggered by the lack of full budget authority.

A CMS-Based Competency Assessment of the DoD Contracting Workforce

Rene G. Rendon, Naval Postgraduate School
Funded by Director, Acquisition Talent Management (DATM), Department of the Navy

In April 2020, the DoD senior procurement executives established a new contracting competency model and a single level of certification program for the DoD contracting workforce. The new competency model is based on the National Contract Management Association (NCMA) Contract Management Standard (CMS). This new DoD contracting competency model complies with the requirement in Section 861 of the FY2020 NDAA to base a professional certification on standards developed by a third-party accredited program. The purpose of this research is to conduct a competency assessment on a sample of the DoD contracting workforce using the NCMA CMS. This research will answer the following question: Based on the competency assessment results, in which contract management competencies is the workforce less proficient and less knowledgeable? Based on the competency assessment results, recommendations for competency development are provided to the assessed organization.

Telling Time: Getting Relevant Data for Acquisition Schedule Estimating Relationships

Charles Pickar and Raymond Franck, Naval Postgraduate School

Funded by Director, Acquisition Talent Management (DATM), Department of the Navy

This continuing project aims to examine weapons systems development schedules to identify ways to predict the duration of the defense acquisition schedule more accurately. This study aims to provide a more complete understanding of the myriad factors that drive the weapon system development timelines. In particular, we propose to investigate insights from contemporary data science methods to identify variables critical to predicting acquisition schedules through Schedule Estimating Relationships.

The Fourth Industrial Revolution's Wave Crashes Upon the Shores of Accounting: The Value Metric for the Fourth Industrial Revolution

Thomas Housel and Timothy Shives, Naval Postgraduate School

Funded by Office of the Undersecretary of Defense for Acquisition and Sustainment (OUSD A&S)

Almost 30 years ago, Elliott (1992) shared several critical insights about the inadequacies of the field of accounting to account for radical changes in the ways businesses develop and execute strategy based on the fundamental opportunities that had come about due to information age technology. Accounting has remained virtually unchanged for over 500 years and society has now entered what Schwab (2015) referred to as the "Fourth Industrial Revolution" where technology advancements follow an exponential growth curve introducing a reality that combines technology across the physical, digital, and biological domains. The Fourth Industrial Revolution has the potential to change both public and private sector organizations, and society itself, however, accounting practices are not positioned to take advantage of these changes. With this phenomenon in mind, this study seeks to address a gap in the literature: current accounting practices are insufficient to meet the challenges of the Fourth Industrial Revolution as they do not provide a raw, non-monetized common unit of value that can measure productivity on a ratio scale for non-profit organizations or at the sub-corporate level in for-profit organizations. Through a discussion guided by the literature, this study seeks to generate a scholastic dialogue on how to address this problem.

Program Management versus Portfolio Management in Defense Acquisition

Robert F. Mortlock, Raymond Jones, Conor Stewart, Adam Deitrich, and Jordan Reid, Naval Postgraduate School

Funded by Office of the Undersecretary of Defense for Acquisition and Sustainment (OUSD A&S)

This research performed a gap analysis on the existing Department of Defense (DoD) program management competency standards to determine if changes are required to fully adopt product portfolio management (PPM) strategies in defense acquisition. Current DoD program management standards are

compared to the Project Management Institute's Portfolio Management Professional certification standards to analyze alignment and gaps between the standards. Barrier to Implementation (BTI) scores are assigned to address the identified gaps in the DoD standard. The study found that the DoD program management competencies are on average 41% aligned with portfolio management industry standards. The DoD program management competencies are least aligned with the portfolio management domains of governance and strategic alignment. The composite BTI score indicates low to medium level of implementation barriers for most of the gaps. Results indicate that the DoD is capable of conducting PPM, and further research is needed to fully align the current competency standards with industry best practices. Defense acquisition senior leaders should consider formulating DoD portfolio management career field functional competencies to address congressional mandates for portfolio management implementation within the DoD.

Faculty Research Grants from the Acquisition Innovation Research Center

Last year, two NPS faculty member teams were each awarded one of eight acquisition innovation incubator grants from the Acquisition Innovation Research Center (AIRC), stood up in 2020.

Dr Daniel J Finkenstadt, Dr Erik Helzer and Perry McDowell from NPS and Dr Rob Handfield and Dr Arnav Jhala from NC State University have been teamed on a joint AIRC incubator study since summer of 2021. In this study the teams have developed a suite of games and research projects to study the impacts of gamification on defense acquisition education and training with teams of graduate students from both institutions. To date they have developed a first-person shooter game to teach mandatory sources of supply and category management, pinball and pachinko games to teach protest risk, a digital escape room to teach protest risk and an early prototype of a tower defense game to teach contingency contracting procedures and strategies. The teams have published an article in *Contract Management* Magazine, presented their work at the 2022 ARP Symposium, delivered a white paper to AIRC and have a pending invited article in U.S. Naval Institute's *Proceedings*.

The team is currently negotiating a phase II to this AIRC grant to continue work related to gamer types, escape rooms and tower defense games.

Dr. Johnathan Mun is principal investigator on AIRC incubator research developing a transparent Decisions Options Register (DOR) database system that can inculcate institutional corporate memory for the Department of Defense (DoD). Decision-making based on precedence will address the DoD's loss of institutional knowledge when employees leave or are reassigned elsewhere. Phase I of this project provides example case applications and mock-up DORs complete with stylized data and examples to illustrate the capabilities of the multidisciplinary, integrated methodology. The applied techniques are shown to provide decision makers with options based on their most important criteria and support the

identification of factors critical to the success or failure of decisions within a program or acquisition. The recommended approaches include the use of artificial intelligence, machine learning, and advanced quantitative methods such as neural networks, stochastic simulation and probabilistic analysis, classification and logit predictive modeling, integrated risk management, stochastic optimization, text scraping sentiment analysis, lexicographic ranking, PROMETHEE, and ELECTRE.

Phase II research will include discussions with key DoD personnel, subject matter experts, key decision-makers, and program managers to determine a roadmap to enhance the success of generating a searchable DOR database. Results from Phase II will deliver practical knowledge which can be applied to implement and scale use of DORs across the Defense Acquisition enterprise.

Read the published report from AIRC: **Management and Business Knowledge Representation for Decision Making**.

Faculty Peer-Reviewed publications

The following faculty research reports were recently accepted for publication at peer-reviewed journals:

- **Aruna Apte and Ken Doerr**, et al. (2022). Analysis of vertical lift capabilities of US Navy (USN) in humanitarian assistance and disaster relief (HADR), *Journal of Defense Analytics and Logistics,* March 2022, https://doi.org/10.1108/JDAL-10-2021-0012
- **Chong Wang** et al. (2022). The impact of artificial intelligence (AI) finance on financing constraints of non-SOE firms in emerging markets, *International Journal of Emerging Markets*, 17 (4): 930-944. https://doi.org/10.1108/IJOEM-02-2021-0299
- **Chong Wang** et al. (2022). Menu of contracts: A new approach to improving Navy retention bonuses, *Journal of Defense Resources Management*, 13(1): 5- 31.
- **Erik Helzer** et al. (2022). The character lens: A person-centered view of moral recognition and ethical decision-making. *Journal of Business Ethics*.
- **Erik Helzer** et al. (2022). Honesty among lawyers: moral character, game framing, and honest disclosures in negotiations. *Negotiation Journal*.
- **James Fan and Tom Ahn,** et al. (2022). Predicting skilled workforce retention: a machine-learning approach with Royal Australian Navy sailors. *Military Operations Research*. 2022.
- **James Fan** and Christopher Griffin (2022). Control problems with vanishing Lie Bracket arising from complete odd circulant evolutionary games. Journal of Dynamics and Games. April 2022, 9(2): 165-189. doi: 10.3934/jdg.2022002
- **Jennifer Heissel** et al. (2022). Does pollution drive achievement? The effect of traffic pollution on academic performance, *Journal of Human Resources* 57(3): 747-776.
- **Marigee Bacolod** and **Jennifer Heissel**, with Ansley White. Job performance when workers work in locations they prefer, *Applied Economics Letters*. https://doi.org/10.1080/13504851.2022.2081656
- **Maxim Massenkoff** and Nathan Wilmers, Wage stagnation and the decline of standardized pay rates, 1974-1993, Forthcoming at *American Economic Journal: Applied Economics*.

- **Sean Webeck** and Hongseok Lee (2022). The behavioral foundations of representative bureaucracy, *Perspectives on Public Management and Governance*. 4 April, 2022. https://doi.org/10.1093/ppmgov/gvac013
- **Sean Webeck** and Vasabjit Banerjee (2022). Civil–military relations: Through a perilous lens. *Armed Forces & Society*. SAGE Journals. July 17, 2022 https://journals.sagepub.com/doi/full/10.1177/0095327X221108198
- **Yu-Chu Shen** et al. (2022). Structural inequities for historically underserved communities in the adoption of stroke certification in the United States, *JAMA Neurology*. Forthcoming.

Editor-Reviewed publications

- **Daniel Finkenstadt and Aruna Apte**, with Rob Handfield (2022). "Developing supply chain immunity for future pandemic disruptions", *Journal of Humanitarian Logistics and Supply Chain Management,* Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/JHLSCM-09-2021-0096 https://cmr.berkeley.edu/2022/01/certainty-satiation-marketing-for-disrupted-supply-chains/
- **Robert Mortlock** (2022). "Been there, done that: behavioral acquisition", *Army AT&L Magazine*, 88-95.
- **Uday Apte**, et al. (2022), "Strategy in information intensive service", in M. Davis (Ed.), *Research Handbook on Services Management*, Edward Elgar Publishing, Northampton, Mass, pp 2-22.

Faculty Awards

Mr. David Kaczorowski , The Department of Defense Management Executive Master of Business Administration Teaching Excellence Award (Winter 2022)

Dr. Aruna Apte, The Louis D. Liskin Award for Teaching Excellence in the Department of Defense Management (Spring 2022)

Dr. Erik Helzer, The Louis D. Liskin Award for Teaching Excellence in the Graduate School of Defense Management (Fall 2022)

Lt Col Daniel Finkenstadt, USAF, The Military Officers Association of America Joint Service Warfare Award – (Fall 2022)

Prof Paul Lester, The First Command Military Leadership Award (Fall 2022)

Professor Profile: Michael Schilling

CDR Michael Schilling joined the Naval Postgraduate School faculty in July of 2021. He is an alumnus of Naval Postgraduate School (NPS), with a Master of Business Administration in Acquisition and Contracting, and holds a Bachelor of Science and Business Administration in Finance from The Ohio State University Fisher College of Business. He currently teaches Principles of Acquisition & Contract Management (MN3303), Acquisition Management & Contract Administration (MN3315), and Contracting for Services (MN4311).

Prior to reporting to NPS, CDR Schilling was a Senior Procurement Analyst at the Office of the Assistant Secretary of the Navy for Research, Development, and Acquisition. He has also served as Director of Operations at Naval Supply Systems Command, Fleet Logistics Center Yokosuka from 2015-2018, and Deputy Division Head of Aircraft Support Contracts and Contracting Specialist at Naval Air Systems Command from 2012-2015 after his graduation from NPS.

How did you get into the research field of acquisition?

I luckily fell into the acquisition career field by my random placement as a student in the Acquisitions and Contracting curriculum at NPS. Originally, my first pick was Supply Chain Management as I'm very passionate about that area and am certified Life Cycle Logistics Level 3. My placement in the NPS 815 program turned out to be a blessing, as I have thoroughly enjoyed the contracting field, specifically my education, experience and predominantly the challenges, not to mention the wonderful workforce I've met during my involvement in the acquisition community.

CDR Michael Schilling with his family at Morro Bay State Park

As a student, I was fascinated by the somewhat overwhelming process of defense acquisitions. I love to deep dive into process improvement and was given that chance on my ARP-sponsored research project analyzing the project management triangle of major DoD acquisition programs.

Right now, you are the only active-duty Navy instructor of acquisition teaching in the Department of Defense Management. How does that perspective shape your work with students and the acquisition curriculum?

I do believe there is something very different an active-duty military member brings to the classroom. **Having that recent relationship and relevance closer to the fight can provide an easier understanding of the learning objectives.** I constantly incorporate real world examples that resulted in or have future impacts on the acquisition process throughout the world.

Given my previous assignments as a Naval officer, I especially enjoy mentoring the junior Supply Corps Officers. But I'd like to think I represent more than just the Navy. My approach to teaching always considers the larger context of defense acquisition as well as the diverse student population at NPS that includes military and civilians from all branches of DoD, and even foreign military students. Regardless of where the student comes from, they all share the same mission—defending our nation and supporting the warfighters on the front line.

Our informal classroom conversations provide an opportunity to share these different perspectives, information, and backgrounds. This interdisciplinary learning environment—unique to NPS—has the potential to broaden the thinking of everyone involved, myself included. At the end of the day, this diversity helps achieve our NPS mission to improve our future leaders and improve our warfighters' effectiveness at defending our nation.

How has the Acquisition Research Program (ARP) supported your research and professional development—or that of your students?

I was introduced to ARP as a student and was lucky enough to have that support. Beyond the direction and formatting support that I'm sure our advisors were grateful for, ARP also supported us in our data mining that we otherwise wouldn't have been able to accomplish in the amount of time we had to complete our research.

I recommend that all my students check out ARP because of that support I received as a student. Now I'm in the advisor role for students working on ARP sponsored topics. Sometimes the hardest part for the students is picking a topic. I've seen this even on smaller assignments I conduct in class. Those struggling students who reach out and receive an ARP sponsored topic are usually off and running towards completion of their research project.

***How does your research (or teaching/mentoring) impact current acquisition or operational processes*?**

Another great question, and I refer to my earlier mention about the inability to truly quantify our impact here at NPS. **I believe the time students have here at NPS provides an education that could only be topped by years of experience.** I have had countless students tell me they learned so much from class discussions or assignments, and the broad experience shared from classmates multiplies the knowledge gained for many students.

I like to think that knowledge will be applied to current or future acquisitions our students will be working on. I try to stress the importance of the entire acquisition team working together throughout every procurement. **Each member, be it the program manager, contracting officer, COR, engineer, financial manager, legal, warfighter, or any other member of that acquisition team plays a key role in every procurement.** The challenge is making sure every member's voice of the team is heard and applied to improve each buy.

What advice would you give students considering research in acquisition generally?

First, really focus on what is important to your research to begin with; be it a problem statement, hypothesis, curiosity, or any other basic reason for the research. Second, consider the data set required. Is it quantitative, qualitative, or both? Often the data may not be obtainable because information can be restricted or unfortunately hard to come by, and the DoD is far from masters of knowledge management. Also, what are the second, third, or fourth order implications of the data and research?

Third, who cares? Identify stakeholders of your research, but don't let that differentiate your direction or product. Which parties could be impacted by any of the findings? At what level or timing of the acquisition will this research apply? Finally, pick something you are truly curious or passionate about. Your research process will be so much easier and enjoyable if you are truly devoted to your topic.

Put on your predicting hat: What kind of information and analysis do you think will be most needed by the acquisition community in the next 5 years?

Wow, where to start? I think the obvious answer is technology, specifically as it applies to machine learning, artificial intelligence, biotechnology, and alternative energy to name a few. Also, just as important are supply chain resilience, humanitarian efforts, and global/space requirements or impacts. Earlier this year, NASA's Perseverance rover found remnants of metal debris on Mars. The week before, the world's most powerful telescope, costing roughly $10 billion, launched into space and was damaged by a meteor. Those are examples of 'minor' details that could have huge ramifications on tomorrow's procurements.

Recently, we have seen the importance of supply chain and humanitarian impacts. The world has been very reactive to both of these challenges, and we need to start thinking proactively. The COVID pandemic is an example of this. We can point at almost every global epidemic or natural catastrophe and say we should have been better prepared for that, and this seems to repeat on every occasion. Part of it is the command and control (C2), but I see a large effort in the acquisition challenges: supply chain, procurement, or the like. I saw a respectable response by the SECDEF to COVID by quickly standing up a procurement task force to supply emergency and medical supplies across the nation.

I don't believe we have invested or focused enough on alternative, sustainable, and environmentally-friendly energy resources. I have major concerns from a national defense perspective of the impact of Red Hill fuel facility being shut down. Beyond the impacts to local population which I won't discuss, look at the logistical challenge that needs to be addressed. **We had acquisition and sustainment challenges prior to the Red Hill closure with the fuel gap across the Pacific. Now, it's been compounded.** From a DoD and acquisition standpoint, we need to develop alternative solutions. Oil tankers and in-flight refueling resources are a few band-aids we can apply, but from an acquisition perspective may not be ready within the next

five years. Project Pele and the micro nuclear reactor could be a solution, but again how long to acquisition fruition?

Finally, I think the acquisition community needs to look at possible reform of the Patent and Trademark Law Amendments Act. With the exponential growth of technology, our freedom may depend on intellectual property rights. A possible solution to this is the use of blockchain in intellectual property rights. The power of blockchain technology and smart contracts could benefit both industry and government. Contracting of this sort will not be an easy task, but nobody ever said acquisitions are easy.